Food and Agriculture Organization of the United Nations

Forest sector contribution to national economies 2015

The direct, indirect and induced effects on value added, employment and labour income

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The direct, indirect and induced effects on value added, employment and labour income

Background Paper for The State of the World's Forests 2022 report

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Contents

Abbreviations and acronyms *v*
Acknowledgements *vi*

1. Introduction **1**

1.1. Background **1**
1.2. Goal and objectives **2**
1.3. Organization of this report **3**

2. Scope, method and data **5**
2.1. Sectoral scope **5**
2.2. Measures of economic contribution **5**
3.1. Geographic scope **9**
3.2. Data **10**

4. Economic contribution of the forest sector in the study countries **13**
4.1. Contribution to national gross domestic product **13**
4.2. Contribution to employment and labour income **16**
4.3. Top sectors affected by the forest sector in the study countries **19**

5. Estimating the economic contribution of the forest sector in other countries **21**

6. Economic contribution of the world's forest sector in 2015 **23**

7. Assessment of data availability and quality **29**

8. Summary **33**

9. References **37**

Tables

Table 1. Value added contributions and multipliers of the forest sectors in 62 study countries, 2015 14
Table 2. Employment contributions and multipliers of the forest sectors in the 62 study countries, 2015 16
Table 3. Labour income contributions and multipliers of the forest sectors in the 62 study countries, 2015 19
Table 4. Estimated contribution of the world's forest sector in value added by subsector and effect type, 2015 24
Table 5. Estimated contribution of employment in the world's forest sector by subsector and effect type, 2015 26

Figures

Figure 1. Conceptual illustration of the ripple effects of an economic activity 2
Figure 2. Countries and territories with 2015 IMPLAN data 11
Figure 3. Distributions of the value added multipliers (Type SAM) for each forest subsector of the 62 study countries, 2015 15
Figure 4. Distributions of the employment multipliers (Type SAM) in the 62 study countries for each forest subsector, 2015 18
Figure 5. Multiplier effects of the forest sector in the 62 study countries, 2015 35

Boxes

Box 1 Informal employment in the forest sector 6
Box 2 Forest-based recreation and tourism 8

Abbreviations and acronyms

Eurostat	Statistical Office of the European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistical Database
GDP	Gross domestic product
I-O	Input-output
ILO	International Labour Organization
IMPLAN	Economic Impact Analysis for Planning
ISIC	International standard industrial classification
MRIO	Multi-regional input-output
NWFP	Non-wood forest products
OECD	Organisation for Economic Co-operation and Development
SAM	Social accounting matrix
SDG	Sustainable Development Goal
SOFO	State of the World's Forests
UN	United Nations
UNCTAD	The United Nations Conference on Trade and Development
UNCTAD-Eora GVC	UNCTAD-Eora Global Value Chain database
UNIDO	United Nations Industrial Development Organization
UNSD	United Nations Statistics Division
WIOD	World Input-Output Database

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Executive summary

The forest sector[1] can help a country make progress towards its economic growth, social wellbeing and environmental sustainability in many ways. To help stakeholders unlock the forest sector's full potential and to achieve sustainable development, it is important to understand the sector's contribution to national economies.

The Food and Agriculture Organization of the United Nation's (FAO) State of the World's Forests 2014 (SOFO 2014) report estimated the direct contribution of the global forest sector to gross domestic product (GDP), employment and trade. To understand the full economic contribution of the forest sector, it is necessary to look beyond the direct industry impacts within the sector and evaluate the far-reaching economic effect it has on other industries as well as the ripple effects throughout the economy.

This study proceeds further along the path made by SOFO 2014 in estimating the socioeconomic benefits of forests by incorporating the impacts of the forest sector on other sectors in the national economy. Besides its direct effects, the forest sector has indirect effects on other sectors along the upstream supply chain and induced effects on domestic economies through employee spending. As countries align their national frameworks with the Sustainable Development Goals (SDGs), the forest sector can assist policymakers to identify development potential and opportunities in their country.

This study uses an input-output (I-O) model approach to estimate the total economic contribution of the forest sector in 62 countries in 2015. Specifically, the Economic Impact Analysis for Planning (IMPLAN) data and model system developed by the IMPLAN Group is used because of its data availability and country coverage. IMPLAN is used to model and estimate the economic contribution of a country's forest sector to its national economy in terms of value added, employment and labour income. These 62 countries together account for 72 percent of the world's total forest area. They contributed 94 percent to the global GDP and produced 93 percent of total global industrial roundwood, 93 percent of sawlogs and veneer logs, 94 percent of sawnwood, 97 percent of wood-based panels and 98 percent of paper and paperboard in 2015.

[1] Analysis of the System of National Accounts (SNA) allows forest-related production to be separated into the specific categories of "forestry and logging", "solid wood products" and "pulp and paper". Wood furniture and wood energy are accounted for under furniture manufacturing and energy, respectively. This report has made manually disaggregated furniture estimates, based on factors developed from available disaggregated data. Non-wood forest products are not included due to a lack of global estimations.

This study found that the contribution of the forest sector to the national economy goes beyond the sector itself and extends into many other sectors of the economy through indirect and induced effects. In the 62 study countries, the number of jobs generated in domestic sectors by the forest sector through backward linkages exceeds the number of direct jobs in the forest sector itself. Additional jobs in other sectors are supported by the consumer spending of the employees in the forest sector and the affected supplying sectors. The total indirect and induced value added to other sectors by the forest sector also exceeds the direct value added produced in the sector.

For every USD 1 that the forest sectors in these countries contributed to GDP in 2015, an additional USD 1.12, on average, was generated in the national economy, including approximately USD .65 generated in the supply sectors through backward linkages[2] and USD .47 that was generated by employees of the forest sector and its supply sectors spending on goods and services. For every dollar of income earned through labour in the forest sector, USD 1.26 of labour income was earned in other sectors within the national economy, including USD .72 in the supplying sectors and USD .54 in other sectors.

For every 100 jobs in the forest sector of these countries, an additional 73 jobs, on average, were supported in the national economy, including approximately 39 jobs in the supply sectors through backward linkages and 34 jobs in other sectors due to employees of the forest sector and its supply sector spending on goods and services in 2015.

Since many forest industries are in rural areas, they have important implications for rural development and for improving livelihoods among rural populations. Rural development may have different contexts for different countries, but an enhanced forest sector is expected to bring employment and income opportunities to rural populations. This contributes to eradicating hunger, alleviating rural poverty and improving rural livelihoods in general, regardless of the development stage and region.

Also in this study, a set of econometric models were developed to estimate the economic multipliers of forest subsectors in those countries where the IMPLAN data were unavailable. GDP has a unanimous positive impact on all multipliers, meaning that economies with larger GDP are likely associated with higher economic multipliers. Per capita income has a negligible impact despite its significance. The percentage of the population in rural areas has a positive impact on value added and labour income multipliers. The solid wood products subsector, pulp and paper products subsector and the wood furniture subsector tend to have higher multipliers than the forestry and logging subsector. Most subregion dummy variables are significant, implying substantial regional differences in the economic multipliers.

Based on the estimated economic multipliers and FAO's statistics on the forest sector's value added and employment, we estimated the total economic

[2] Backward linkages capture the demands of the forest sector for inputs (goods and services) from its supply sectors and successive rounds of spending.

contribution of the global forest sector taking into consideration direct, indirect and induced effects. More than 19.16 million people were estimated to be employed in the global forest sector in 2015. Accounting for the indirect and induced effects, the global forest sector supported an estimated total of 32.38 million jobs in their national economies around the globe. The global forest sector directly contributed more than USD 661 billion to their GDP. Accounting for the indirect and induced effects, the global forest sector (formal) contributed more than USD 1.523 billion to their national economies around the globe in 2015.

Economic multipliers vary by subsector and the wood-based processing subsectors generally have relatively higher multipliers than the forestry and logging subsector. This study suggests that there is potential for forest sectors in countries in Africa to increase their contribution to GDP and domestic employment by developing wood-based processing subsectors.

The sectors of wholesale and retail trade, transportation and storage, business sector services, financial and insurance activities, and electricity, gas and water supply rank high for indirect effects of the forest sector in terms of employment, value added and labour income. Additionally, the indirect effects of the forest sector on employment in the fabricated metal products and construction sectors are quite substantial. The wholesale and retail trade, public administration and defense, health and social work, real estate activities and education sectors rank high for induced effects of the forest sector in the 62 countries that were studied.

This study also found room for improvement in the availability and quality of national input-output economic accounting data to obtain a more robust estimate of the forest sector's economic contribution in each country. Improvements in the availability of national input-output data for more countries (especially in Africa, Latin America and the Caribbean, Asia and Oceania) would provide more comprehensive and accurate estimates of the global forest sector's contribution to national economies. Even for those countries where IMPLAN data is available, more detailed industry breakdowns of the forest subsectors might help us gain insight into the economic impacts of the various forestry industries and subsectors and generate more meaningful policy recommendations for developing the forest sector.

The IMPLAN data and software used for this study could also present some limitations. The models rest on a set of assumptions: 1) constant returns to scale; 2) linear and homogenous production functions; 3) perfectly elastic factor suppliers; and 4) constant technology. Some of the assumptions may not hold true in reality. Compared to the data package for Canada and the United States of America, the IMPLAN international data package still has room for further improvement in the breakdown of sectors and the method of impact modelling. Caution should be taken when applying the results to a specific country or forest subsector.

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1. Introduction

1.1. BACKGROUND

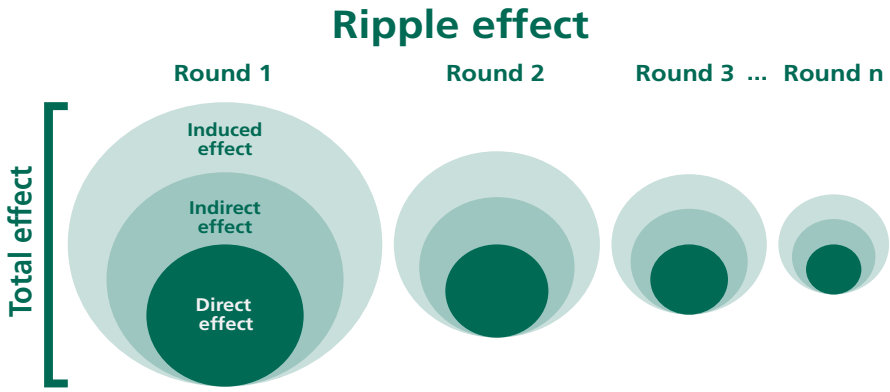
The forest sector can contribute to a country's economic growth, social wellbeing and environmental sustainability in many ways. A growing number of countries have acknowledged the importance of the forest sector and have included strengthening the forest sector and improving its value added into their national forest strategy. Nevertheless, policy makers often find themselves without the information they need to make informed decisions. For example, it would be useful for policymakers to know how much the forest sector contributes to the national economy, and how various forest industries interact with other sectors in that economy.

These are universal challenges and are not limited to developing countries. The past decades have seen a global decrease in the direct contribution of the forest sector to national economies (Lebedys and Li, 2014; Agrawal *et al*., 2013). Since the forest sector is based mostly in rural and remote areas, many policymakers see revitalizing the sector as a means of improving rural livelihoods and income (Wear and Hyde, 1992; Hughes and Vlosky, 2000). However, a lack of knowledge about the forest sector's economic contribution and the linkages between the forest sector, other sectors and rural communities means the forest sector does not receive enough support.

The Food and Agriculture Organization of the United Nation's (FAO) State of the World's Forests 2014 (SOFO 2014) report estimated that the global forest sector directly contributed over USD 600 billion to the global economy and employed more than 13.2 million people in the formal sector and another 41 million in the informal sector around the world in 2011. To understand the full economic impact of the forest sector, however, one must look beyond the direct industry impacts and evaluate the far-reaching economic consequences of the sector for other industries and account for the ripple effects throughout the economy. For example, sawnwood production and employment in sawmills are commonly measured as the economic contribution of the sawmilling industry (direct effects). Additionally, the sawmilling industry also purchases non-wood inputs from other sectors, such as machine and equipment, energy, tools and maintenance services. Therefore, the sawmilling industry affects other sectors in the supply chain that provide materials and services to the industry (indirect effects). The spending by employees of the sawmilling industry and the supplying industries count

as induced effects in the local area. Estimates of the total economic impact (including direct, indirect and induced effects) of the forest sector provides more robust information to decision makers who need to understand the forest sector's contribution to local economies (Figure 1).

Figure 1. Conceptual illustration of the ripple effects of an economic activity



Source: Authors' own elaboration.

This study proceeds further along the path made by SOFO 2014 in estimating the economic contribution of the global forest sector by incorporating the impacts of the forest sector on other sectors in the national economy. Following Li, Mei and Linhares-Juvenal (2019), the estimation is made using Input-output (I-O) based impact analysis and econometric models. The results can help stakeholders to understand the importance and multiplier effects of the forest sector to the national economy in a quantifiable way.

1.2. GOAL AND OBJECTIVES

The goal of this study is to estimate the total economic contribution of the global forest sector to national economies in 2015. The contribution includes the direct, indirect and induced effects of the forest sector.

Specific objectives include:

- conduct I-O based economic contribution analyses of the forest sector for countries having the 2015 Economic Impact Analysis for Planning (IMPLAN)[1] data (the most recent data available);
- estimate the economic contribution of the forest sector based on an econometric model for countries lacking IMPLAN data;
- estimate the economic contribution of the global forest sector to national economies in 2015; and
- discuss factors affecting the economic contribution of the forest sector and suggest ways to enhance its potential.

[1] The IMPLAN software and data by the IMPLAN Group.

1.3. ORGANIZATION OF THIS REPORT

This report is structured as follows: Section 2 describes the methodology and data used in the analysis; section 3 presents the economic contribution of the forest sectors for the countries in the study where IMPLAN data was available; section 4 presents the econometric model used to estimate economic multipliers for those countries where IMPLAN data was unavailable; section 5 compiles the results and provides an estimate of the global forest sector's contribution to national economies in 2015; and section 6 discusses the limitations, provides a summary and a conclusion.

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2. Scope, method and data

2.1. SECTORAL SCOPE

The forest sector in the study includes: 1) forestry and logging activities subsector (forestry and logging); 2) primary and secondary solid wood products manufacturing subsector (solid wood products); 3) primary and secondary paper and paperboard manufacturing subsector (pulp and paper products); and 4) wooden furniture manufacturing subsector (wood furniture).

Since informal economic activities (e.g. fuelwood collection, charcoal production, and non-wood forest products collection and processing) are not often captured in the national statistics of most countries, this study focuses only on the formal forestry activities. Additionally, the ecosystem service subsector is excluded from this study because separate statistics for forest-based ecosystem services are often unavailable for most countries. This means the results could indicate a lower estimation of the economic contribution of the global forest sector. These exclusions may mean a considerable underestimation in those countries where such activities represent a significant share of their forest sector (See Box 1 and Box 2).

Official forest product production and trade statistics focus on wood-based products, historically the main products derived from forests and with established markets. For many forest owners and managers, wood-based products are by far the most important source of income and employment in forestry and they play a major role in rural recovery and development. Wood furniture and wood energy are accounted for in the system of national accounts under furniture manufacturing and energy, respectively. Data for wood energy still tend to be under-reported and unreliable, although an exception is the production and trade of wood pellets, which is a relatively well-documented product that makes up an increasing share of wood-based energy in the total final energy consumption.

2.2. MEASURES OF ECONOMIC CONTRIBUTION

In this study, the forest sector's economic contributions are evaluated in terms of three widely used economic indicators:

1. **Value added** is the value of output less the value of intermediate consumption (gross value added). It is a measure of the contribution to gross domestic product (GDP) made by an individual sub-sector or the whole forest sector.

Box 1
Informal employment in the forest sector

Informal employment consists of the total number of informal jobs carried out in formal sector enterprises, informal sector enterprises or households, during a given reference period (ILO, 2003). Informal employment includes:

- own-account workers and employers working in their own informal sector enterprises;
- family workers, regardless of whether they work in formal or informal sector enterprises;
- employees holding informal jobs, whether employed by formal sector enterprises, informal sector enterprises or as paid domestic workers by households;
- members of informal producers cooperatives;
- own-account workers engaged in producing goods exclusively for their own final use by their household (such as subsistence farming or do-it-yourself construction of their own dwellings).

According to the Sustainable Development Goals Report 2019 (UN, 2019), informal employment remains high in less developed countries. Generally, more women take on informal employment than men.

Informal employment in the forest sector mainly includes work in wood production that is not captured in the official statistics (e.g. in fuelwood collection and charcoal production, unrecorded production of materials used for housing, and small-scale enterprises making handicrafts and other artisanal products), plus people employed in the commercial production of non-wood forest products (NWFPs). Data on these informal forestry activities are limited for various reasons. For example, fuelwood and charcoal are normally produced on a small scale, of relatively low per unit economic value and are largely for self-consumption. Therefore, fuelwood and charcoal producing activities are not usually captured by national statistics. Employment in small and medium enterprises (e.g. chainsaw milling and charcoal production) is not accounted for in formal statistics mainly because they are not officially registered as enterprises or their scale is below the cutoff criteria of enterprises for official statistics.

The forest sector has a high degree of informal employment, especially in developing countries (ILO, 2019; Kniivilä and Alho, 2017). FAO (2014) estimates that about 880 million people, or 13 percent of the global population, are somewhat engaged in fuelwood and charcoal production (41 million in full time equivalent). FAO (2022) estimates that the share of informal employment can be as high as 80 percent of the total forest sector related employment in Asia and Oceania and 90 percent in Africa. In some countries, chainsaw milling accounts for a significant portion of the total timber production (e.g.

30 to 40 percent in Guyana, the Congo, Democratic Republic of the Congo and Uganda; more than 50 percent in Cameroon, Ghana and Peru) (Wit *et al.*, 2010; Cerutti *et al.*, 2013).

FAO has been working diligently to improve the international statistics of forest products. Several initiatives have been carried out by FAO in collaboration with other organizations and programmes (e.g. Center for International Forestry Research, International Food Policy Research Institute, The Program on Forests, World Bank and the Global Strategy) to improve agricultural and rural statistics. They have also sought to address the information gap in informal forestry activities, including: 1) providing guidelines on incorporating a wood fuel module into existing household surveys in developing countries (Borlizzi, 2018; Sorrenti, 2017); 2) examining non-wood forest products in international statistical systems and proposing improved scope of NWFPs classification in the Harmonized Commodity Description and Coding System (Sorrenti, 2017); and 3) presenting survey modules on forest and wild forest products (Bakkegaard *et al.*, 2016).

2. **Employment** is the annual average number of full-time and part-time jobs. It is adjusted for seasonality but not for number of hours a day. Therefore, it is not full-time equivalent.
3. **Labour income** includes all forms of employment income, including employee compensation (wages and benefits) and proprietor income (payments received by self-employed individuals and unincorporated business owners).

For each economic indicator, three tiers of effect are estimated. In the first tier, direct effects measure the forest sector's own production, employment, labour income and value-added. The total economic contribution of the forest sector, however, is contained entirely within the forest sector. Forest industries buy intermediate supplies and services from other upstream local industries along the supply chain to support their production. These types of backward linkages generate the second tier of effects, or indirect effects, to local suppliers. Finally, the forest sector contributes to a national economy through local spending by employees working in the forest sector and through the indirect effects of the forest sector's purchases from local industries. These result in induced effects, representing the third tier of the forest sector's effects on the economy.

Only local purchase and consumer spending (within the same country in this study) can contribute to the local economy and be included as part of the total effects. Imported goods and services and corporate and household savings are leakages into the local economy (within the countries of interest in this study).

Box 2
Forest-based recreation and tourism

Forest-based recreation and tourism are an important and growing component of the national economy in many parts of the world (Bell *et al.*, 2007; Kniivilä and Alho, 2017). Recreational uses of forests vary greatly by type of forest, local culture and socio-economic characteristics of the users. Forests activities normally include (but are not limited to) hunting, camping, watching wildlife, viewing fall foliage, viewing the scenery, hiking, biking and other forest-based recreational activities (Rosenberger *et al.*, 2017). The demand for forest-based recreation and tourism has been increasing as urbanization accelerates dramatically around the world (White *et al.*, 2016; Bell *et al.*, 2007). Despite the importance, there is a lack of systematic data on the magnitude of the economic importance of forest-based recreation and tourism for most countries.

There are an increasing number of regional or local level studies on the economic benefits or economic contribution of forest-based recreation and tourism (Hodges, Court and Rahmani, 2017; Hughes, 2015). For example, a study by the North East State Foresters Association in the United States of America found that the forest-based recreation economy contributed nearly as many jobs as the wood-based economy in the country's Northeastern region in 2013. Nature-based tourism (mostly forest-based) in Finland is estimated to contribute EUR 1.9 billion to the national economy in 2019 (Government of Finland, 2022).

Another set of indicators frequently used to describe indirect and induced effects in the economic impact analysis are economic multipliers. A Type I multiplier is the ratio of direct and indirect effects to direct effects. It captures intra-industry transactions as a result of a change in the total demand for the forest sector's final products. A Type SAM (social accounting matrix) multiplier is the ratio of total effects (direct, indirect and induced) to direct effects. The Type SAM multiplier captures not only intra-industry transactions but also household spending and transfers between institutions selected in the model. Unlike the economic indicators mentioned above, Type I and Type SAM multipliers are unit free. Multipliers capture the relative magnitude of the ripple effects of a sector's economic activities in the local economy. Type I and Type SAM multipliers are calculated for each economic indicator in this study.

3.1. GEOGRAPHIC SCOPE

Countries in this study are grouped into the following fifteen subregions in line with the groupings by the United Nations Statistics Division (UNSD) for the Sustainable Development Goal (SDG) database (UNSD, 2016):

- Australia and New Zealand
- Central Asia
- Eastern Asia
- Eastern Europe
- Latin America and the Caribbean
- Northern Africa
- Northern America
- Northern Europe
- Oceania (excluding Australia and New Zealand)
- South-eastern Asia
- Southern Asia
- Southern Europe
- Sub-Saharan Africa
- Western Asia
- Western Europe

Methods

The I-O approach is used for 62 countries to estimate the total economic contribution of the forest sector to each of the national economies in 2015. The IMPLAN database and model, widely used for impact analysis, are used in this study. The recently released international dataset makes it possible to conduct impact analyses for more than 60 countries and areas. Unlike the cross-regional value-added trade databases for value added analysis along global value chains (e.g. the United Nations Conference on Trade and Development- [UNCTAD] Eora Global Value Chain [GVC] database), World Input-Output database, and the Organisation for Economic Co-operation and Development's [OECD] Trade in Value Added database), the IMPLAN focuses on the impact analysis of an industry or economic activity within an economic area (state, country or multiple states). The impacts are measured not only by valued added but also by employment and compensation. Regional purchasing coefficients of the forest subsectors in the IMPLAN models are adjusted (zeroed out) to eliminate the intermediate material purchase between these subsectors and prevent overstating the sector's economic contribution.[2]

Otherwise, an econometric approach is used to estimate a country's economic multipliers by subsector. An econometric model is developed to quantify significant factors that determine/affect the multiplier effects of the forest sector's economic impact based on the multipliers from the 62 countries in this study. Based on potential economic causal relationships as well as past research findings (Jacobsen *et al*., 2014), the following variables are selected:

[2] See IMPLAN (2021) for details about using IMPLAN for multi-industry contribution analysis and Parajuli *et al.* (2018) for a comparison of the two commonly used methods for multi-industry contribution analysis.

economy size as measured by GDP, per capita income, total roundwood production, percentage of rural population, forest subsector dummy variables and geographical region dummy variables.

The linear model is expressed as

$$(1) \quad \ln(y_{ij} - 1) = a + b_1 \ln(GDP_j) + b_2 INC_j + b_3 RW_j + b_4 RP_j + b\,DUM + e_{ij}$$

where y is the multiplier, GDP is in constant USD of 2015, INC is per capita income, RW is total roundwood production in thousand cubic metres, RP is percentage of rural population, DUM is a group of subsector and subregion dummy variables, and e_{ij} is the error term. Subscript i indicates one of the four forest subsectors (i.e. forestry and logging, solid wood products, pulp and paper products, and wood furniture) and subscript j indexes countries. The log transformation on y is to ensure $y - 1$ and the log transformation on GDP is to reduce its variation across countries. The model specification is equivalent to a fixed effects model in panel data analysis. With the exception of DUM, data for all other variables are from the results obtained through the IMPLAN models. After Equation (1) is estimated, out-of-sample fitted values are used for countries without the IMPLAN data. The multipliers along with the country's national labour and economic statistics are then used to estimate its forest sector's economic contribution in 2015.

Countries with forest sector employment (all four subsectors combined) of less than 1 000 in USD of 2015 are excluded from this study.[3] This exclusion is assumed not to have a significant impact on the global and regional totals. These countries should be included in future studies where a comprehensive assessment of all countries around the world is the main objective.

3.2. DATA

The data for the I-O based contribution analysis are from the default data available in IMPLAN and the primary data collected by the authors. Therefore, the analysis is largely determined by the default production function in IMPLAN and transactions among institutions/industries. Although the IMPLAN sector classification for the United States of America and Canada has the most detail, with more than 30 sectors directly related to forest products, the 2015 international data package is used to ensure consistency across the study countries. The data is aggregated from multiple sources (e.g. OECD Eurostat, and WIOD) and is organized into a 37-sector scheme. Sector 1 (agriculture, hunting, forestry and fishing), Sector 5 (wood and products of wood and cork), Sector 6 (pulp, paper, paper products, printing and publishing), and Sector 18 (furniture and other manufactured goods not otherwise classified) are used as event sectors for impact modeling. Data on industry output, value added and

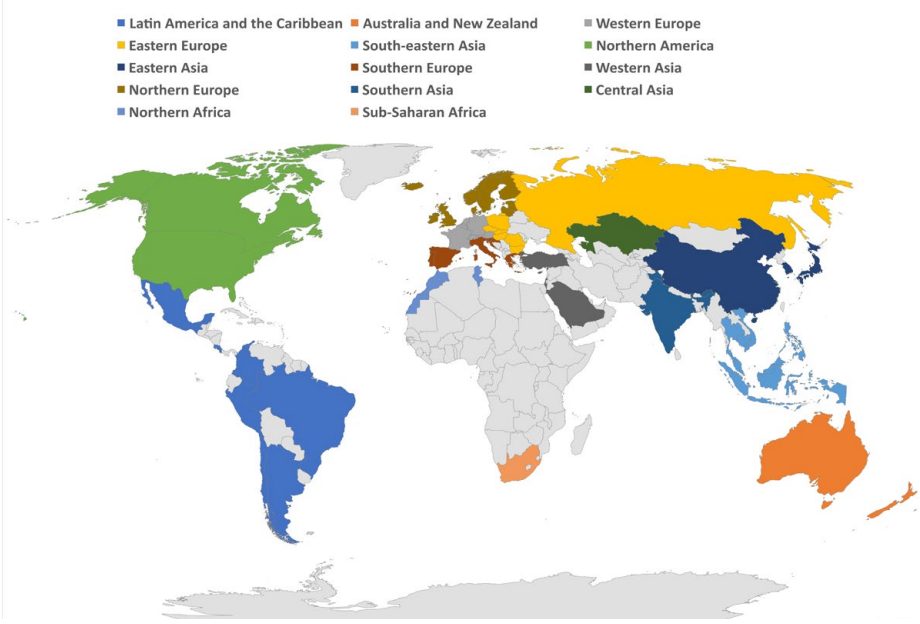
[3] Based on the authors' estimates from various sources of national and international statistics, including the International Yearbook of Industrial Statistics by the United Nations Industrial Development Organization (UNIDO), the ILOSTAT database by the International Labour Organization (ILO), and the employment data by the United Nations Statistics Division (UNSD).

employment for each forest subsector are obtained primarily from FAO internal estimates, supplemented with primary data from the UNSD, International Yearbook of Industrial Statistics by the United Nations Industrial Development Organization (UNIDO), the ILOSTAT database by the International Labour Organization (ILO), and national official statistics. Statistics for International standard industrial classification (ISIC) Rev. 4 Division 31 (manufacture of furniture) are used as an approximation for the wood furniture manufacturing subsector unless official statistics are available for the subsector. The default data in IMPLAN are checked against estimates from other sources and are used if they are consistent. Values are in USD of 2015.

Data for the econometric analysis come from multiple sources. GDP, per capita income, rural population and total population are from the 2015 IMPLAN default data (study area statistics). Roundwood production is from FAOSTAT.

Figure 2 shows the countries where the 2015 IMPLAN data are available. These countries/territories together accounted for 72 percent of the world's forest area. They contributed to 94 percent of the global GDP and produced 93 percent of total global industrial roundwood, 93 percent of sawlogs and veneer logs, 94 percent of sawnwood, 97 percent of wood-based panels and 98 percent of paper and paperboard products in 2015. See Annex 1 for the forest area and forest products production statistics for these countries/territories.

Figure 2. Countries and territories with 2015 IMPLAN data



Source: Author's own elaboration (map adapted to Map No. 4170 Rev. 19 UNITED NATIONS October 2020)

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations or the institutions to which the authors are affiliated.

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4. Economic contribution of the forest sector in the study countries

This section presents the I-O model based estimates of the forest sector's economic contribution for the 62 countries in the study in terms of value added, employment and labour income. For each economic indicator, the contribution is presented by effect type and subsector. Economic multipliers are estimated for each subsector and generated for the forest sector as a whole. Major non-forest sectors that are impacted by the forest sector are identified.

4.1. CONTRIBUTION TO NATIONAL GROSS DOMESTIC PRODUCT

Value added measures the contribution to national GDP by an industry, a subsector or a sector. The forest sectors of the 62 countries directly contributed an estimated USD 623.77 billion to their national GDP in 2015 (Table 1). In addition to its direct contribution, the forest sectors of these countries indirectly contributed USD 516.65 billion to their GDP through the value added that was generated in the sectors that supply the products and services that support forest sector production. Additionally, the forest sector also contributed another USD 305.65 billion to their GDP through the local spending by employees in the sector itself and through the indirectly affected supplying sectors. Accounting for its overall multiplier effects, the forest sectors of the 62 countries contributed an estimated USD 1 446.07 billion to their national economies in 2015. For every dollar contributed by the forest sectors in these countries to their national GDP in 2015, an additional USD 1.12 on average was generated in their national economies, including approximately USD .65 generated in the supplying sectors through backward linkages and USD .47 was generated due to spending on goods and services by employees in the forest sector and by their suppliers.

Among the four subsectors, the pulp and paper products manufacturing subsector contributed the most directly, amounting to USD 199.10 billion. Accounting for its multiplier effects, the pulp and paper products manufacturing subsector of these countries contributed an estimated USD 626.44 billion in value added through its direct, indirect and induced effects. For every dollar generated in the pulp and paper products manufacturing subsector of these countries, an additional USD .95 on average was generated through backward

linkages with the supplying sectors, and an additional USD .62 was generated through employee spending of the subsector and its supplying sectors.

The solid wood products manufacturing and wood furniture manufacturing subsectors of the 62 countries directly contributed USD 156.55 billion and USD 125.53 billion, respectively. Including direct, indirect and induced effects, the solid wood products manufacturing subsector of these countries contributed USD 561.42 billion to national GDP and the wood furniture manufacturing subsector contributed USD 340.09 billion. For every USD generated in the solid wood products manufacturing subsector of these countries, an additional USD 1.76 was generated and circulated in the national economy. For every USD generated in the wood furniture manufacturing subsector, an additional USD 1.41 was generated in the economy.

The forestry and logging subsector of the 62 countries directly contributed USD 142.59 billion to their national GDP in 2015. With an average Type SAM multiplier of 1.85, the subsector generated a total value added of USD 261.20 billion to their national economies including direct, indirect and induced effects.

TABLE 1.
Value added contributions and multipliers of the forest sectors in 62 study countries, 2015

Subsector	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	------ 2015 constant, USD billion ------					
Forestry and logging	142.59	67.19	51.42	261.20	1.55	1.85
Solid wood products	156.55	264.24	140.63	561.42	2.09	2.76
Pulp and paper products	199.10	285.57	141.77	626.44	1.95	2.57
Wood furniture	125.53	133.95	80.61	340.09	1.82	2.41
Total forest sector	623.77	516.65	305.65	1 446.07	1.65	2.12

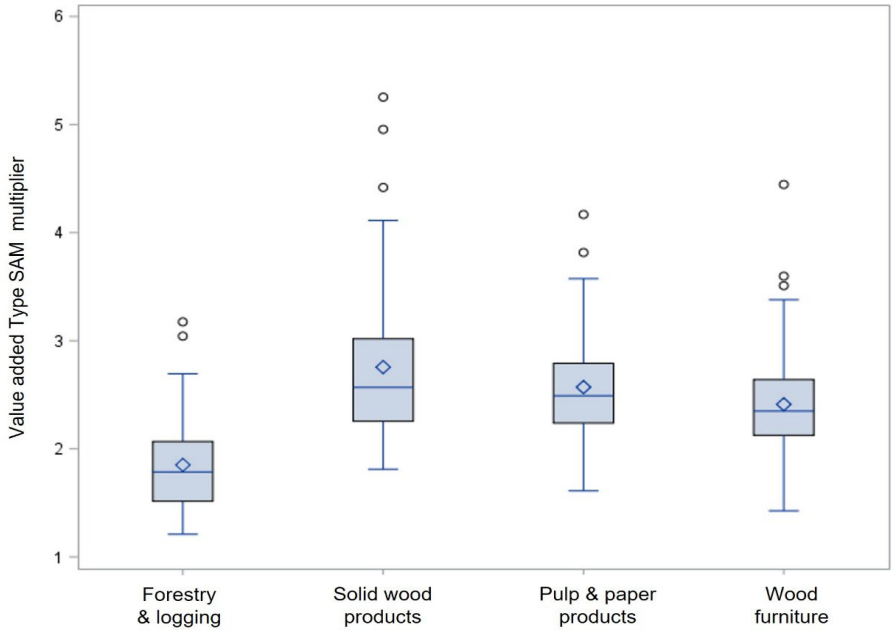
Source: Author calculations based on IMPLAN. 2021. *International IMPLAN data (model year 2015) and modeling software*. Huntersville, NC.

Note: Total effects = direct effects + indirect effects + induced effects. The direct effects across subsectors are additive but the total effects are not additive. For example, a portion of the indirect effects for the solid wood products manufacturing subsector is already included in the direct effects for the forestry and logging subsector. Summing the individual subsector indirect and induced impacts would result in double counting.

For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. The multipliers in the table are simple averages across the study countries.

Figure 3 shows the distribution of the value added multipliers (Type SAM) of the study countries by forest subsector in 2015. The average multiplier of the forestry and logging subsector is significantly lower than those of the three wood-based manufacturing subsectors, which means that the forestry and logging subsector on average generates less additional revenue elsewhere in the national economy than the three wood-based manufacturing subsectors. Value added multipliers among the three manufacturing subsectors (solid wood products, pulp and paper products and wood furniture) are not statistically different. However, variations of the multipliers among countries in the forestry and logging subsectors are smaller than in other subsectors.

Figure 3. Distributions of the value added multipliers (Type SAM) for each forest subsector of the 62 study countries, 2015



Source: Author calculations based on IMPLAN. 2021. *International IMPLAN data (model year 2015) and modeling software*. Huntersville, NC.

This observation supports the prevalent regional and national policies of enhancing wood-based manufacturing products industries for greater domestic economic impacts by the forest sector. Having domestic wood-based manufacturing industries not only increases value added in the forest sector itself but also generates value added and supports jobs in other sectors of the economy through indirect and induced effects.

The multipliers presented so far are mostly global average and, therefore, could mask the variability between countries. Annex 2 presents the forest sector's contribution to national GDP and the value added multipliers by

country and subsector. Countries having relatively higher multipliers for most forest subsectors include (but are not limited to) Australia, China, New Zealand, the United States of America and the Russian Federation. A few countries have relatively higher multipliers for some subsectors, such as Brazil (pulp and paper products), Canada (all except for furniture), Finland (solid wood products, pulp and paper products), India (wood furniture) and Sweden (solid wood products, pulp and paper products).

4.2. CONTRIBUTION TO EMPLOYMENT AND LABOUR INCOME

The forest sector of the 62 study countries directly provided 16.95 million full-time and part-time jobs in 2015 (Table 2). Additionally, the forest sector of these countries indirectly supported 7.18 million jobs in the upstream domestic sectors along the supply chain. Another 5.21 million jobs in the national economies were supported/created due to consumer spending by the employees in the forest sector and by the indirectly impacted supplying sectors. Accounting for its overall multiplier effects, the forest sector of the 62 study countries supported an estimated total of 29.34 million jobs in their national economies.

For every 100 direct jobs in the forest sector of these countries, an additional 73 jobs on average were supported in the national economy, including approximately 39 jobs in the supplying sectors through backward linkages and 34 jobs in other sectors due to spending on goods and services by employees in the forest sector and its supplying sectors in 2015.

TABLE 2.
Employment contributions and multipliers of the forest sectors in the 62 study countries, 2015

Subsector	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- million jobs----------					
Forestry and logging	3.88	0.52	0.45	4.85	1.35	1.69
Solid wood products	4.49	5.13	2.32	11.94	1.89	2.38
Pulp and paper products	4.25	6.25	3.46	13.96	1.94	2.59
Wood furniture	4.33	5.17	3.52	13.02	1.66	2.23
Total forest sector	16.95	7.18	5.21	29.34	1.39	1.73

Sources: Author calculations based on UNIDO. 2021. *International Yearbook of Industrial Statistics 2021*. USA: Northampton, MA. Edward Elgar Publishing, Inc.; ILO. 2021. *ILOSTAT: employment by sex and economic activity*. https://ilostat.ilo.org/data/. Cited 10 October 2021; UNSD. 2021. *Employed population by status in employment, industry and sex*. http://data.un.org. Cited 10 October 2021.

Note: Total effects = direct effects + indirect effects + induced effects. The direct effects across subsectors are additive but the total effects are not additive.

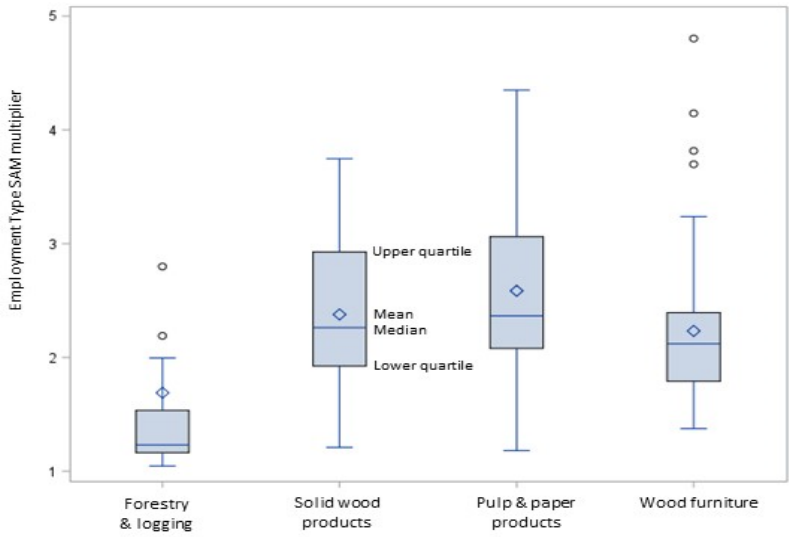
For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. The multipliers in the table are simple averages across the study countries.

The forest subsectors in the 62 study countries each directly employed around 4 million people (mostly more than 4 million except for the forestry and logging subsector). Including direct, indirect and induced effects, the forestry and logging subsector supported 4.85 million jobs in the national economy of these countries; the solid wood products manufacturing subsector of these countries supported an estimated total of 11.94 million jobs; the pulp and paper products manufacturing subsector supported 13.96 jobs; and the wood furniture manufacturing subsectors supported 13.02 million jobs, respectively, in the national economies of these countries.

On average, every 100 jobs in the forestry and logging subsector supported another 69 non-forestry jobs elsewhere in the national economy. For every 100 jobs in its own subsector, the solid wood products manufacturing, the pulp and paper products manufacturing, and the wood furniture manufacturing subsectors supported an additional 138, 159 and 123 jobs in other sectors of the economy, respectively.

Figure 4 shows the distribution of the employment multipliers (Type SAM) in the study countries by forest subsector in 2015. The forestry and logging subsector's employment multiplier appears to be significantly lower than other subsectors. Compared to the forestry and logging subsector, the solid wood products manufacturing and the pulp and paper products manufacturing subsectors have more dispersed employment multipliers among these countries. There are a few significant country outliers for the wood furniture subsectors. Multipliers are influenced by many factors, including an industry's productivity, degree of reliance on imports, economic and welfare policy, and tax policy.

Figure 4. Distributions of the employment multipliers (Type SAM) in the 62 study countries for each forest subsector, 2015



Sources: Author calculations based on UNIDO. 2021. *International Yearbook of Industrial Statistics 2021*. USA: Northampton, MA. Edward Elgar Publishing, Inc.; ILO. 2021. *ILOSTAT: employment by sex and economic activity*. https://ilostat.ilo.org/data/. Cited 10 October 2021; UNSD. 2021. *Employed population by status in employment, industry and sex*. http://data.un.org. Cited 10 October 2021.

Labour income is part of value added but deserves a separate analysis since it directly reflects the income and benefits of residents received from the forest sector. The forest sectors of the 62 study countries directly generated USD 180.99 billion in labour income in 2015 and supported an additional USD 155.03 billion through indirect impacts and USD 102.52 billion through induced impacts (Table 3). Accounting for its overall multiplier effects, the forest sectors of the 62 study countries supported an estimated total of USD 438.54 billion in labour income in their national economies.

For every USD of employee or proprietor income generated by the forest sector of these countries, an additional USD 1.26, on average, of labour income in other sectors of the national economy was generated through indirect effects (USD .72) and induced effects (USD .54).

Annex 3 and Annex 4 present the forest sector's contribution to national economies in terms of employment and labour income by country and subsector.

TABLE 3.
Labour income contributions and multipliers of the forest sectors in the 62 study countries, 2015

Subsector	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	------ 2015 constant, USD billion ------					
Forestry and logging	16.44	9.21	7.89	33.54	1.56	2.04
Solid wood products	48.95	73.14	58.42	180.51	1.98	2.67
Pulp and paper products	61.85	87.07	55.15	204.06	1.97	2.67
Wood furniture	53.74	54.14	37.92	145.80	1.89	2.51
Total forest sector	180.99	155.03	102.52	438.54	1.72	2.26

Source: Author calculations based on IMPLAN. 2021. *International IMPLAN data (model year 2015) and modeling software*. Huntersville, NC.
Note: Total effects = direct effects + indirect effects + induced effects. The direct effects across subsectors are additive but the total effects are not additive.
For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. The multipliers in the table are simple averages across the study countries.

4.3. TOP SECTORS AFFECTED BY THE FOREST SECTOR IN THE STUDY COUNTRIES

The wholesale and retail trade, transportation and storage, business sector services, financial and insurance activities, and electricity, gas and water supply sectors ranked high for indirect effects by the forest sector in terms of employment, value added and labour income in the 62 study countries in 2015. Additionally, indirect effects by the forest sector on employment of the fabricated metal products and construction sectors are quite substantial. The wholesale and retail trade, public administration and defense, health and social work, real estate activities, and education sectors rank high for induced effects by the forest sector for the studied countries. An expansion in the forest sector could generate more demand and growth in these sectors in general than in other sectors in the economy, which means that these industries are most influenced by the expansion/contraction of the forest sector.

Note this is a generation of major sectors most likely impacted by the forest sector in the 62 study countries. Depending on circumstances and situations, the top sectors impacted by the forest sector could be different for a specific country.

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5. Estimating the economic contribution of the forest sector in other countries

Eq (1) is used to predict the economic multipliers of the forest subsectors in the selected countries without the IMPLAN data.

GDP has a unanimous positive impact on all multipliers. Industries in large economies tend to have higher multipliers than those in small economies. Per capita income has a negligible impact despite its significance. Percentage of rural population has a positive impact on value added and labour income multipliers. Most subregion dummy variables are significant, implying substantial regional differences in economic multipliers. Overall goodness of fit as measured by the R^2 ranges from 0.33 to 0.63 and the F-stat cannot reject the null hypothesis that all coefficients are zeros.[4]

Multipliers for countries in the rest of the world are estimated as the fitted values from the above econometric model (Annexes 5 and 6). The multipliers are then used with the sectoral statistics to estimate the economic contribution of each forest subsector to the national economy. Given a greater idiosyncratic variation at the country level, we suggest averaging multipliers and calculating economic contributions at a higher subregion level.

[4] Regression results are available from the authors upon request.

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6. Economic contribution of the world's forest sector in 2015

Table 4 and Table 5 present the estimated contribution of the world's forest sector to national GDP and employment[5] by subsector, subregion, and effect type in 2015. The global forest sector directly contributed more than USD 661 billion to their national GDP (Table 4). Accounting for the total effects, the global forest sector (formal) contributed more than USD 1 523 billion to their national economies in 2015. More than 19.16 million people were estimated to be directly employed in the global forest sector (formal) in 2015 (Table 5). Accounting for the direct, indirect and induced effects, the global forest sector (formal) supported an estimated total of 32.38 million jobs in their national economies.

[5] The sector's contribution in terms of labour income is not included due to the limited availability of national statistics on labour income for countries lacking 2015 IMPLAN data.

TABLE 4.
Estimated contribution of the world's forest sector in value added by subsector and effect type, 2015

Region/ subregion	Forestry and logging		Solid wood products		Pulp and paper products		Wood furniture		Total forest sector	
	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects
	2015 constant, USD million									
Africa	13 457	45 360	2 170	7 150	2 651	8 735	4 206	11 621	22 483	48 328
Northern Africa	388	583	302	648	868	1 938	635	1 252	2 193	3 626
Sub-Saharan Africa	13 069	44 776	1 868	6 501	1 783	6 797	3 571	10 369	20 290	44 702
Americas	39 679	92 050	18 398	55 038	31 702	90 184	15 413	39 454	105 192	257 275
Latin America and the Caribbean	10 322	20 417	6 996	18 473	19 875	56 740	8 834	23 089	46 027	101 540
Northern America	29 356	71 632	11 402	36 565	11 827	33 445	6 579	16 365	59 165	155 735
Asia	81 474	126 558	88 984	364 562	108 045	373 477	59 452	181 749	337 955	765 307
Central Asia	99	160	189	384	180	378	189	393	656	1 315
Eastern Asia	36 096	66 831	78 845	335 004	88 670	327 302	43 563	142 467	247 174	607 166
South-eastern Asia	10 503	15 201	5 101	16 463	8 570	20 935	7 115	18 773	31 290	56 660
Southern Asia	33 641	42 535	1 063	2 615	3 730	8 907	998	2 735	39 431	59 701
Western Asia	1 135	1 831	3 788	10 096	6 896	15 955	7 586	17 381	19 404	40 465

Region/ subregion	Forestry and logging		Solid wood products		Pulp and paper products		Wood furniture		Total forest sector	
	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects
	2015 constant, USD million									
Europe	30 505	59 534	47 188	132 381	58 741	158 485	48 818	112 529	185 252	423 109
Eastern Europe	8 826	17 618	9 024	26 608	8 833	24 073	7 436	20 800	34 119	77 176
Northern Europe	9 630	17 348	12 067	33 816	15 853	45 042	16 658	31 691	54 209	116 649
Southern Europe	3 884	6 632	7 663	21 389	11 019	31 076	9 579	24 758	32 145	77 009
Western Europe	8 164	17 936	18 434	50 568	23 036	58 294	15 145	35 280	64 778	152 276
Oceania	2 365	6 012	3 742	15 248	2 636	9 267	1 454	4 686	10 197	28969
Australia and New Zealand	1 948	5 420	3 716	15 199	2 620	9 237	1 444	4 669	9 728	28 168
Melanesia	417	593	26	49	16	30	10	17	468	801
Grand Total	167 480	329 514	160 482	574 661	203 775	640 149	129 343	350 039	661 079	1 522 988

Source: Author calculations based on IMPLAN. 2021. *International IMPLAN data (model year 2015) and modeling software*. Huntersville, NC.

Note: Direct effects measure existing activities in the forest subsectors. Total effects = direct effects + indirect effects + induced effects. The direct effects across subsectors are additive but the total effects are not additive. For example, a portion of the indirect effects for the solid wood products manufacturing subsector is already included in the direct effects for the forestry and logging subsector. Summing the individual subsector indirect and induced impacts would result in double counting.

For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects.

Regional multipliers are simple averages of the study countries in the region.

TABLE 5.
Estimated contribution of employment in the world's forest sector by subsector and effect type, 2015

Region/subregion	Forestry and logging		Solid wood products		Pulp and paper products		Wood furniture		Total forest sector	
	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects
	thousand jobs									
Africa	307	667	286	1 212	165	653	443	1 943	1 202	1 979
Northern Africa	28	36	39	80	61	117	51	98	179	244
Sub-Saharan Africa	279	631	247	1 136	105	536	392	1 846	1 023	1 735
Americas	534	887	836	2 385	853	2 712	948	2 164	3 172	6 445
Latin America and the Caribbean	376	563	369	1 053	468	1 612	522	1 279	1 736	3 122
Northern America	158	324	467	1 332	385	1 099	426	885	1 436	3 323
Asia	2 245	2 676	2 663	7 179	2 632	9 279	2 515	8 747	10 055	15 717
Central Asia	31	37	8	16	12	24	16	28	68	91
Eastern Asia	1 119	1 363	1 647	4 897	1 650	6 503	1 358	6 110	5 774	9 985
South-eastern Asia	642	773	616	1 489	393	1 205	717	1 770	2 368	3 213
Southern Asia	315	343	172	287	331	1 021	150	236	967	1 139
Western Asia	138	161	221	490	247	525	274	604	879	1 289
Europe	1 335	1 709	1 228	3 161	892	2 327	1 121	2 563	4 577	7 908
Eastern Europe	771	961	535	1 576	291	811	490	1 220	2 087	3 352
Northern Europe	235	322	197	454	145	424	156	347	733	1 368
Southern Europe	199	243	207	446	165	439	232	479	804	1 335

Region/subregion	Forestry and logging		Solid wood products		Pulp and paper products		Wood furniture		Total forest sector	
	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects	Direct effects	Total effects
Western Europe	131	183	289	685	290	654	243	517	953	1 854
Oceania	50	79	60	180	26	72	29	49	164	331
Australia and New Zealand	30	55	54	170	25	71	27	46	136	288
Melanesia	19	23	6	10	1	2	2	3	28	43
Grand Total	4 471	6 018	5 073	13 963	4 568	15 042	5 056	15 466	19 169	32 380

*Sources: Author calculations based on UNIDO. 2021. International Yearbook of Industrial Statistics 2021. USA: Northampton, MA. Edward Elgar Publishing, Inc.; ILO. 2021. ILOSTAT: employment by sex and economic activity. https://ilostat.ilo.org/data/. Cited 10 October 2021; UNSD. 2021. Employed population by status in employment, industry and sex. http://data.un.org. Cited 10 October 2021.*Note: Direct effects measure existing activities in the forest subsectors. Total effects = direct effects + indirect effects + induced effects. The direct effects across subsectors are additive but the total effects are not additive. For example, a portion of the indirect effects for the solid wood products manufacturing subsector is already included in the direct effects for the forestry and logging subsector. Summing the individual subsector indirect and induced impacts would result in double counting.

For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. Regional multipliers are simple averages of the study countries in the region.

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7. Assessment of data availability and quality

The estimates of the global forest sector's economic contribution are reached using two approaches: an I-O modelling approach for countries with the IMPLAN data and an econometric approach for countries without the IMPLAN data. The I-O modelling is the preferred approach wherever the data are available because it generates more accurate estimates.

The 2015 IMPLAN data are currently available for 62 countries/areas. As discussed in the methods section, these countries accounted for a great majority of global industrial roundwood harvest and major wood-based products production (sawlogs and veneer logs, pulpwood, and pulp and paper) in 2015. Although the estimates of the economic contribution of the forest sector for these countries very likely provides a good approximation of the total economic contribution at the global level, having data coverage for more countries is still better because each country faces unique circumstances in terms of natural resource endowments and each has a different cultural, social and economic context. Economic multipliers and the contribution of the forest sector of the countries without the IMPLAN data are estimated based on the 62 countries with the data. However, potential bias may exist because there could be inherent differences between countries with and without the data. The core of the IMPLAN data is an I-O matrix of national economic accounting that records how each sector interacts with the other sectors and institutions of an economy. Improvement in the availability of the national I-O matrix for more countries will help to make more precise estimates. Low availability of the IMPLAN data for countries in sub-Saharan Africa, Northern Africa, Western Asia, and Latin America and the Caribbean subregions may affect the precision and accuracy of the regional multiplier and contribution estimates in these subregions.

For countries with the IMPLAN data, improving the data availability for a more detailed breakdown of the forest industries could yield more accurate estimates. Primary and secondary solid wood products are grouped together in the current IMPLAN database for most countries (except for Canada and the United States of America). The pulp and paper industry is grouped with printing and publishing and there is no breakdown of primary and secondary paper manufacturing industries.[6] We would reasonably assume that the

[6] Primary paper product manufacturing converts pulp into paper or paperboard. Secondary paper products manufacturing mainly produces paper products (e.g. container, cardboard, stationery products, sanitary products) from paper and paperboard.

multiplier effects of the primary and secondary wood products industries could be different. This could stem from the difference in their demand for goods and services used in production. Some secondary wood products manufacturers may use a higher portion of imported wood materials, causing lower multipliers. Forestry and logging activities are in most cases mixed with other agricultural activities. The wood furniture manufacturing industry is not separated from the non-wood furniture manufacturing industry and in most cases is lumped together with other manufacturing activities into one very general category of industries. Systematic errors might arise if the authors' estimation of the wood furniture manufacturing activity is significantly off from the real activity. For example, industry outputs of the wood furniture manufacturing subsector for many countries were estimated based on the proportion of the subsector in an aggregate industry group (e.g. furniture manufacturing or other manufacturing not elsewhere classified) in terms of value added or employment. In reality, these two proportions may be different, causing under- or over- estimation of the subsector's economic contribution. Improving the further breakdown of the sectors in IMPLAN will help yield more accurate estimates of multipliers for each subsector/industry.

In this study, separate IMPLAN models were constructed for each country. Economic contributions of each subregion and the total 62 countries were calculated by aggregating the country-specific economic contribution. Multipliers are simple averages across countries in the subregion. The delineation of the study area plays an important role in the magnitude and multipliers of the economic contribution. Usually, the larger the study area, the more inter-industry linkages, the less leakage from the economy, and the larger the economic multiplier effects of an industry.[7] The multiplier listed for the region/subregion in this report should not be interpreted as multipliers that take account of the trade flows among countries within the same region/subregion.

Additionally, industry output is the most important input for IMPLAN impact analysis. For most countries with IMPLAN data, data on industry output for solid wood products manufacturing and pulp and paper products manufacturing subsectors are available from UNIDO and the accuracy levels are likely to be high. Industry output data for the forestry and logging subsector is relatively less available and less accurate for some countries.

There are a few caveats with the forest sector delineation in this study. Some

[7] The IMPLAN model has a multi-regional input-output (MRIO) function built in for regional analysis in the United States of America. The MRIO generates more accurate estimates because it considers not only the impacts of a specific industry on a region's economy but also regional interactions. Unfortunately, the MRIO function is currently unavailable in a multiple-country model. This issue could be addressed by incorporating trade among countries in the future. Considering the high volume of intra-region trade in Europe, the regional economic impacts of the forest sectors in subregions of Europe could be higher than the simple country aggregates presented here.

forest industries are not included because they are lumped into a sector in which most of the industries are not forest-based. For example, large-scale charcoal production is generally listed under ISIC Rev. 4 Class 2011 (Manufacture of Basic Chemicals) with other economic activities engaged in producing chemicals using basic processes such as liquefied industrial or medical gases, dyes or pigments, inorganic acids, etc. The current sector classification of IMPLAN is unable to separate charcoal production from other non-forestry manufacturing. Therefore, the charcoal manufacturing industry is excluded from the study. Many non-wood forest products (NWFP) collecting and processing industries and woody bioenergy production (e.g. wood pellets and wood-based ethanol/methanol) industries are not included due to similar reasons.

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8. Summary

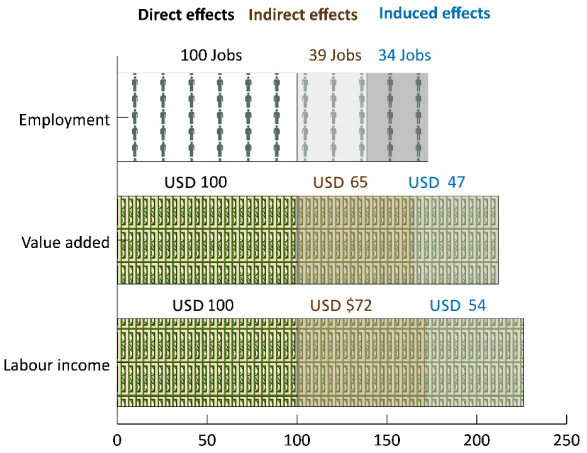
Several main conclusions can be drawn from the current attempts to estimate the ripple effects of the global forest sector on national economies.

- The forest sector's contribution to national economies goes beyond the sector itself and extends to many other sectors of the economy through indirect and induced effects. In the 62 study countries, total indirect and induced value added generated in other sectors by the forest sector through backward linkages exceeded the direct value added in the forest sector itself in 2015. Additional jobs are supported in other sectors due to consumer spending by employees in the forest sector and by affected supplying sectors. Since many forest industries are located in rural areas, this has important implications for rural development and for improving the livelihoods of rural people. Rural development may have different contexts for different countries but an enhanced forest sector is expected to bring employment and income opportunities to rural areas and thus contribute to eradicating hunger, alleviating rural poverty and improving rural livelihoods in general, regardless of the development stage and region. This indicates the potential for the forest sector to contribute to sustainable development.
- More than 19.16 million people were estimated to be employed in the global forest sector in 2015. Accounting for the indirect and induced effects, the global forest sector supported an estimated 32.38 million jobs in their national economies. The global forest sector directly contributed more than USD 661 billion to GDP. Accounting for the indirect and induced effects, the global forest sector (formal) contributed more than USD 1 523 billion to their national economies in 2015.
- Economic multiplier effects vary by subsector. The wood-based processing subsectors (i.e. solid wood products manufacturing, pulp and paper products manufacturing, and wood furniture manufacturing) generally have relative higher multiplier effects than the forestry and logging subsector. The forestry and logging subsector, in general, has relatively lower ripple effects through the economy in terms of most economic measures (value added, employment and labour income) compared to other wood-based manufacturing subsectors. This observation supports regional and national policies of encouraging investment in wood-based manufacturing products industries for greater domestic economic impacts by the forest sector. Many countries restrict exports of unprocessed roundwood to encourage value added activities in the domestic downstream sectors. This study finds that having domestic wood-based manufacturing

industries not only increases value added and creates employment in the forest sector itself but it also generates more value added and supports jobs in other sectors of the economy through indirect and induced effects. However, this does not suggest that countries would always benefit from policies intended to encourage domestic wood processing industries, especially via restrictive trade policies (e.g. log export bans, log export duties or log export quotas). These restrictive log export measures may cause depressed domestic timber prices, inefficiencies in domestic processing facilities and a reduction in export revenues (Boscolo and Vincent, 2000; Resosudarmo and Yusuf, 2006; Solberg et al., 2010; Amoah, Becker and Nutto, 2009). Enhancing a country's competitiveness in factor conditions, demand level, firm strategy and rivalry, and related supporting industries is the ultimate way to achieve comparative advantage (Porter, 2011). Policies intended to promote the forest sector's direct and indirect contribution to the national economy should be formulated in a holistic manner. This observation has regional implications as well. SOFO 2014 found that Africa differs from all other regions in that its roundwood production accounts for most of the wood-based value added of the region while the production of processed forest products makes a relatively small contribution to national GDP. This study suggests that there is potential for forest sectors in Africa to increase their contribution to GDP and domestic employment by developing wood-based processing subsectors. There are multiplier effects through the national economies associated with the development of wood processing industries. Figure 5 illustrates the total multiplier effects of the forest sector in these countries to GDP, employment and labour income.

- The wholesale and retail trade, transportation and storage, business sector services, financial and insurance activities, and electricity, gas and water supply sectors rank high for indirect effects by the forest sector in terms of employment, value added and labour income. Additionally, indirect effects by the forest sector on employment of the fabricated metal products and construction sectors are quite substantial. The wholesale and retail trade, public administration and defense, health and social work, real estate activities, and education sectors rank high for induced effects by the forest sector for the 62 study countries. An expansion in the forest sector could generate more demand and growth in these sectors in general than in other sectors in the economy.
- There is room for improvement in the availability and quality of national I-O economic accounting data for a more robust estimation of the forest sector's economic contribution. Improvement in the availability of national input-output data for more countries (especially in Africa, Latin America and the Caribbean, Asia, and Oceania) would provide more comprehensive and accurate estimates of the global forest sector's contribution to national economies. Even for those countries having IMPLAN data, more detailed industry breakdowns of the forest subsectors might offer greater insight into the economic impacts of various forestry industries/subsectors and generate more meaningful

Figure 5. Multiplier effects of the forest sector in the 62 study countries, 2015



Source: Author calculations based on IMPLAN. 2021. *International IMPLAN data (model year 2015) and modeling software*. Huntersville, NC.

Note: The estimates are generalized based on the 2015 IMPLAN data. They are not meant to be used as indicators of the economic contribution of an individual forest enterprise, industry or subsector in a specific country. Rather, they could be useful to generate an idea of the ripple-effect contributions of the forest sector/subsector to national economies in general.

policy recommendations for the development of the forest sector. Even for those countries where IMPLAN data are unavailable, there is room for improvement in data availability and quality. This study attempts to examine if there are differences in economic multipliers across various wood-based processing subsectors but does not find the expected significant difference in the economic multipliers. Part of the insignificance could possibly stem from the fact that the primary and secondary industries are mixed in both solid wood products, and pulp and paper products manufacturing subsectors in the current IMPLAN models for most countries except for Canada and the United States of America. A more detailed breakdown in forest subsectors may yield some insights into the economic impacts of various forestry industries/subsectors. Some forest industries (e.g. charcoal production, woody bioenergy generation and NWFPs) are not included in the analysis because they are mixed with other non-forestry activities. For countries where charcoal production represents a significant share of forest sector production, this exclusion may cause a considerable underestimation of the forest sector's contribution to their national economies.

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FOREST AREA AND FOREST PRODUCTS PRODUCTION IN THE 62 STUDY COUNTRIES, 2015

Country/area	UNSD region	Forest area	Industrial roundwood	Sawnwood	Wood-based panels	Paper and paperboard
		million ha	----------million m3----------			million tons
Argentina	Latin America and the Caribbean	27.41	11.77	3.13	1.06	1.27
Australia	Australia and New Zealand	124.44	27.29	5.08	1.69	3.18
Austria	Western Europe	3.87	12.57	8.73	3.05	4.96
Belgium	Western Europe	0.68	4.52	1.80	1.97	2.12
Brazil	Latin America and the Caribbean	494.52	136.18	9.98	9.87	10.48
Brunei Darussalam	South-eastern Asia	0.38	0.09	0.05	0.00	0.00
Bulgaria	Eastern Europe	3.81	3.52	0.94	0.97	0.35
Cambodia	South-eastern Asia	9.58	0.32	0.45	0.01	0.00
Canada	Northern America	347.12	151.36	47.11	11.78	10.30
Chile	Latin America and the Caribbean	17.43	43.64	8.37	3.17	1.24
China	Eastern Asia	206.78	148.70	74.36	150.11	111.15
Colombia	Latin America and the Caribbean	58.53	3.28	0.45	0.40	1.22
Costa Rica	Latin America and the Caribbean	2.73	1.36	0.46	0.11	0.25
Croatia	Southern Europe	1.92	3.41	1.49	0.18	0.29
Cyprus	Western Asia	0.17	0.00	0.00	0.00	0.00
Czechia	Eastern Europe	2.67	13.83	4.15	1.26	0.74
Denmark	Northern Europe	0.61	2.03	0.38	0.35	0.17
Estonia	Northern Europe	2.23	6.44	1.77	0.38	0.07
Finland	Northern Europe	22.22	51.45	10.64	1.26	10.32

Country/area	UNSD region	Forest area	Industrial roundwood	Sawnwood	Wood-based panels	Paper and paperboard
		million ha	----------million m3----------			million tons
France	Western Europe	16.88	25.00	7.51	5.39	7.98
Germany	Western Europe	11.42	45.65	21.49	11.71	22.60
Greece	Southern Europe	4.02	0.37	0.11	0.34	0.41
Hungary	Eastern Europe	2.06	3.06	0.49	0.76	0.79
Iceland	Northern Europe	0.05	0.00	0.00	0.00	0.00
India	Southern Asia	70.50	49.52	6.89	8.13	15.44
Indonesia	South-eastern Asia	91.69	74.04	4.17	4.59	10.55
Ireland	Northern Europe	0.75	2.71	0.91	0.77	0.06
Israel	Western Asia	0.16	0.03	0.00	0.12	0.40
Italy	Southern Europe	9.24	2.24	1.47	3.44	8.84
Japan	Eastern Asia	24.96	21.11	9.55	4.62	26.40
Kazakhstan	Central Asia	3.31	0.10	0.23	0.15	0.22
Latvia	Northern Europe	3.36	11.09	3.48	1.27	0.05
Lithuania	Northern Europe	2.18	4.30	1.25	0.82	0.14
Luxembourg	Western Europe	0.09	0.30	0.08	0.32	0.00
Malaysia	South-eastern Asia	22.18	14.42	3.52	5.03	1.75
Malta	Southern Europe	0.00	0.00	0.00	0.00	0.00
Mexico	Latin America and the Caribbean	66.13	5.40	2.55	1.04	5.32
Morocco	Northern Africa	5.64	0.48	0.08	0.09	0.16
Netherlands	Western Europe	0.38	0.85	0.19	0.03	2.64

Country/area	UNSD region	Forest area	Industrial roundwood	Sawnwood	Wood-based panels	Paper and paperboard
		million ha	----------million m3----------			million tons
New Zealand	Australia and New Zealand	10.15	28.97	4.03	1.25	0.72
Norway	Northern Europe	12.11	10.16	2.44	0.45	0.98
Peru	Latin America and the Caribbean	74.14	1.25	0.58	0.06	0.40
Philippines	South-eastern Asia	7.80	3.88	0.32	0.18	0.80
Poland	Eastern Europe	9.41	35.88	4.84	9.69	4.40
Portugal	Southern Europe	3.19	10.80	1.13	1.28	2.22
Republic of Korea	Eastern Asia	6.19	4.54	2.42	3.20	11.57
Romania	Eastern Europe	6.79	10.24	6.30	4.99	0.39
Russian Federation	Eastern Europe	814.97	190.51	34.50	13.54	8.07
Saudi Arabia	Western Asia	0.98	0.00	0.00	0.00	1.19
Singapore	South-eastern Asia	0.02	0.00	0.00	0.02	0.09
Slovakia	Eastern Europe	1.94	8.43	1.60	0.95	0.81
Slovenia	Southern Europe	1.25	3.81	0.73	0.27	0.72
South Africa	Sub-Saharan Africa	9.24	15.28	1.97	1.22	2.25
Spain	Southern Europe	18.38	12.90	1.69	3.86	6.20
Sweden	Northern Europe	28.07	67.30	18.17	0.66	10.26
Switzerland	Western Europe	1.25	2.82	1.16	0.82	1.28
Thailand	South-eastern Asia	16.37	14.60	2.85	7.28	4.83
Tunisia	Northern Africa	1.03	0.30	0.02	0.10	0.15
Türkiye	Western Asia	11.61	20.01	7.77	9.34	2.92

Country/area	UNSD region	Forest area	Industrial roundwood	Sawnwood	Wood-based panels	Paper and paperboard
		million ha	----------million m3----------			million tons
United Kingdom of Great Britain and Northern Ireland	Northern Europe	3.13	8.63	3.49	3.08	3.97
United States of America	Northern America	309.82	354.68	76.36	35.26	72.40
Viet Nam	South-eastern Asia	14.64	33.34	6.00	1.04	1.74
Subtotal		3 024.59	1 720.74	421.69	334.77	400.21
Share of the global total		72%	93%	94%	97%	98%

Source: FAOSTAT. 2021. Forestry production and trade. In: *FAOSTAT*. Cited 17 September 2021. http://www.fao.org/faostat/en/#data/FO

Annex 2. Economic contribution of value added in the forest sector to the 62 study countries by subsector and effect type, 2015

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Africa	**7 735.49**	**5 331.83**	**4 751.03**	**17 818.36**	**1.47**	**1.88**
Northern Africa	**1 551.51**	**500.25**	**422.75**	**2 474.51**	**1.31**	**1.57**
Tunisia						
Forestry and logging	105.93	18.84	15.11	139.88	1.18	1.32
Solid wood products	175.24	110.67	85.75	371.66	1.63	2.12
Pulp and paper products	238.20	198.84	108.58	545.62	1.83	2.29
Wood furniture	385.48	216.78	199.87	802.13	1.56	2.08
Total forest sector	904.85	330.15	304.73	1 539.73	1.36	1.70
Morocco						
Forestry and logging	91.74	16.43	9.36	117.54	1.18	1.28
Solid wood products	107.56	98.96	24.62	231.14	1.92	2.15
Pulp and paper products	247.09	151.95	91.83	490.87	1.61	1.99
Wood furniture	200.27	95.02	54.57	349.85	1.47	1.75
Total forest sector	646.66	170.10	118.01	934.78	1.26	1.45
Sub-Saharan Africa	**6 183.97**	**4 831.58**	**4 328.29**	**15 343.85**	**1.78**	**2.48**
South Africa						
Forestry and logging	551.74	502.94	361.98	1 416.66	1.91	2.57
Solid wood products	1 174.45	853.55	893.42	2 921.41	1.73	2.49

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products	1 401.04	2 057.24	1 549.27	5 007.55	2.47	3.57
Wood furniture	3 056.74	2 940.31	2 286.75	8 283.80	1.96	2.71
Total forest sector	6 183.97	4 831.58	4 328.29	15 343.85	1.78	2.48
Americas	**100 277.78**	**78 983.70**	**68 403.67**	**247 665.15**	**1.72**	**2.24**
Latin America and the Caribbean	**41 113.21**	**32 335.56**	**18 481.62**	**91 930.39**	**1.70**	**2.14**
Argentina						
Forestry and logging	233.97	81.13	72.56	387.66	1.35	1.66
Solid wood products	1 293.47	933.27	897.96	3 124.70	1.72	2.42
Pulp and paper products	3 159.12	2 442.52	2 204.67	7 806.31	1.77	2.47
Wood furniture	2 543.78	2 437.35	2 001.44	6 982.56	1.96	2.74
Total forest sector	7 230.35	4 334.30	4 100.75	15 665.40	1.60	2.17
Brazil						
Forestry and logging	3 265.95	1 948.00	741.77	5 955.71	1.60	1.82
Solid wood products	2 684.78	3 119.08	1 612.05	7 415.91	2.16	2.76
Pulp and paper products	8 855.38	12 670.77	5 718.85	27 245.00	2.43	3.08
Wood furniture	2 859.41	3 057.67	1 632.58	7 549.66	2.07	2.64
Total forest sector	17 665.52	16 691.63	8 474.28	42 831.44	1.94	2.42
Chile						
Forestry and logging	1 318.57	725.58	452.30	2 496.45	1.55	1.89
Solid wood products	1 590.60	1 687.99	730.15	4 008.74	2.06	2.52
Pulp and paper products	2 052.06	1 993.04	791.65	4 836.74	1.97	2.36
Wood furniture	199.90	202.44	122.77	525.11	2.01	2.63
Total forest sector	5 161.13	3 432.68	1 745.56	10 339.37	1.67	2.00
Colombia						
Forestry and logging	559.11	156.20	165.67	880.98	1.28	1.58
Solid wood products	178.20	169.15	103.87	451.22	1.95	2.53
Pulp and paper products	1 089.51	936.28	694.90	2 720.69	1.86	2.50

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Wood furniture	284.04	148.11	111.21	543.37	1.52	1.91
Total forest sector	2 110.85	1 191.34	932.62	4 234.82	1.56	2.01
Costa Rica						
Forestry and logging	36.65	18.34	17.51	72.50	1.50	1.98
Solid wood products	96.40	76.02	67.26	239.68	1.79	2.49
Pulp and paper products	247.40	152.94	146.18	546.51	1.62	2.21
Wood furniture	1 025.20	890.93	717.61	2 633.74	1.87	2.57
Total forest sector	1 405.65	1 009.44	849.71	3 264.80	1.72	2.32
Mexico						
Forestry and logging	1 366.78	399.59	204.45	1 970.83	1.29	1.44
Solid wood products	225.07	184.10	85.58	494.75	1.82	2.20
Pulp and paper products	2 755.13	4 315.88	1 303.18	8 374.19	2.57	3.04
Wood furniture	736.42	920.39	414.77	2 071.58	2.25	2.81
Total forest sector	5 083.40	4 243.43	1 665.54	10 992.37	1.83	2.16
Peru						
Forestry and logging	354.22	83.08	64.43	501.73	1.23	1.42
Solid wood products	485.17	412.10	180.85	1 078.12	1.85	2.22
Pulp and paper products	800.77	560.69	335.94	1 697.40	1.70	2.12
Wood furniture	816.16	610.88	238.98	1 666.01	1.75	2.04
Total forest sector	2 456.32	1 432.72	713.16	4 602.20	1.58	1.87
Northern America	**59 164.57**	**46 648.14**	**49 922.05**	**155 734.76**	**1.77**	**2.60**
Canada						
Forestry and logging	4 745.53	3 950.20	2 615.87	11 311.60	1.83	2.38
Solid wood products	8 183.89	9 305.30	7 292.29	24 781.48	2.14	3.03
Pulp and paper products	8 037.70	7 137.07	6 640.65	21 815.41	1.89	2.71
Wood furniture	4 759.60	2 745.94	3 667.99	11 173.54	1.58	2.35
Total forest sector	25 726.73	16 900.92	17 773.40	60 401.05	1.66	2.35

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
United States of America						
Forestry and logging	24 610.79	19 648.72	16 061.13	60 320.65	1.80	2.45
Solid wood products	3 218.04	4 427.22	4 138.10	11 783.37	2.38	3.66
Pulp and paper products	3 789.12	3 929.09	3 910.88	11 629.09	2.04	3.07
Wood furniture	1 819.89	1 547.97	1 823.53	5 191.40	1.85	2.85
Total forest sector	33 437.85	29 747.22	32 148.65	95 333.72	1.89	2.85
Asia	**326 526.38**	**288 331.23**	**126 938.60**	**741 796.22**	**1.59**	**1.99**
Central Asia	**316.03**	**133.65**	**193.45**	**643.13**	**1.42**	**2.04**
Kazakhstan						
Forestry and logging	95.04	30.14	28.87	154.05	1.32	1.62
Solid wood products	53.25	24.72	42.09	120.06	1.46	2.25
Pulp and paper products	94.65	51.16	66.02	211.83	1.54	2.24
Wood furniture	73.09	43.91	76.56	193.56	1.60	2.65
Total forest sector	316.03	133.65	193.45	643.13	1.42	2.04
Eastern Asia	**247 112.09**	**253 482.93**	**106 441.03**	**607 036.06**	**1.86**	**2.30**
China						
Forestry and logging	33 548.03	13 277.70	15 514.43	62 340.16	1.40	1.86
Solid wood products	69 597.20	163 581.32	74 297.83	307 476.35	3.35	4.42
Pulp and paper products	63 807.31	147 266.65	54 815.37	265 889.32	3.31	4.17
Wood furniture	33 761.00	55 357.82	24 969.52	114 088.35	2.64	3.38
Total forest sector	200 713.54	217 522.13	85 605.54	503 841.21	2.08	2.51
Japan						
Forestry and logging	1 315.22	910.34	366.74	2 592.31	1.69	1.97
Solid wood products	7 410.53	8 175.43	5 572.92	21 158.87	2.10	2.86
Pulp and paper products	18 233.04	16 861.37	9 627.01	44 721.42	1.92	2.45
Wood furniture	6 154.79	7 045.32	2 380.40	15 580.50	2.14	2.53
Total forest sector	33 113.57	26 839.04	15 227.07	75 179.68	1.81	2.27

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Republic of Korea						
Forestry and logging	1 206.20	385.31	236.11	1 827.63	1.32	1.52
Solid wood products	1 820.26	2 939.66	1 543.93	6 303.85	2.61	3.46
Pulp and paper products	6 621.54	6 103.43	3 936.03	16 661.00	1.92	2.52
Wood furniture	3 636.98	5 884.12	3 244.60	12 765.71	2.62	3.51
Total forest sector	13 284.98	9 121.77	5 608.43	28 015.17	1.69	2.11
South-eastern Asia	**30 898.83**	**15 372.11**	**9 601.74**	**55 872.67**	**1.56**	**1.92**
Brunei Darussalam						
Forestry and logging	13.21	14.89	5.68	33.79	2.13	2.56
Solid wood products	5.64	3.09	3.09	11.83	1.55	2.10
Total forest sector	18.85	17.57	8.71	45.13	1.93	2.39
Cambodia						
Forestry and logging	531.85	76.46	149.91	758.22	1.14	1.43
Solid wood products	5.23	3.43	3.02	11.68	1.66	2.23
Pulp and paper products	0.11	0.11	0.07	0.30	2.02	2.68
Wood furniture	2.21	1.05	0.74	4.00	1.47	1.81
Total forest sector	539.40	63.85	103.94	707.19	1.12	1.31
Indonesia						
Forestry and logging	6 105.05	1 158.38	1 262.27	8 525.70	1.19	1.40
Solid wood products	1 601.64	1 526.97	838.72	3 967.33	1.95	2.48
Pulp and paper products	4 038.19	4 445.44	2 342.57	10 826.20	2.10	2.68
Wood furniture	2 948.00	3 641.74	1 927.13	8 516.87	2.24	2.89
Total forest sector	14 692.88	6 514.95	4 238.37	25 446.20	1.44	1.73
Malaysia						
Forestry and logging	2 285.49	523.97	315.20	3 124.67	1.23	1.37
Solid wood products	1 388.04	2 632.52	796.95	4 817.51	2.90	3.47

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products	1 112.53	985.97	350.26	2 448.76	1.89	2.20
Wood furniture	1 005.76	808.99	403.79	2 218.54	1.80	2.21
Total forest sector	5 791.83	2 415.26	1 380.93	9 588.03	1.42	1.66
Philippines						
Forestry and logging	71.07	18.28	24.71	114.06	1.26	1.60
Solid wood products	154.10	125.42	90.37	369.90	1.81	2.40
Pulp and paper products	327.34	283.79	232.56	843.70	1.87	2.58
Wood furniture	134.39	79.89	90.57	304.84	1.59	2.27
Total forest sector	686.90	375.38	300.66	1 362.94	1.55	1.98
Singapore						
Solid wood products	76.19	72.80	40.64	189.63	1.96	2.49
Pulp and paper products	318.72	195.68	132.34	646.74	1.61	2.03
Wood furniture	175.13	183.50	74.30	432.93	2.05	2.47
Total forest sector	570.04	445.91	241.69	1 257.64	1.78	2.21
Thailand						
Forestry and logging	335.58	72.78	73.85	482.22	1.22	1.44
Solid wood products	872.90	919.92	483.11	2 275.93	2.05	2.61
Pulp and paper products	1 783.48	1 138.67	711.43	3 633.57	1.64	2.04
Wood furniture	932.09	997.85	593.58	2 523.52	2.07	2.71
Total forest sector	3 924.06	2 144.64	1 296.39	7 365.08	1.55	1.88
Viet Nam						
Forestry and logging	956.79	454.75	309.90	1 721.44	1.48	1.80
Solid wood products	939.32	2 554.59	1 160.65	4 654.56	3.72	4.96
Pulp and paper products	969.05	928.25	579.68	2 476.97	1.96	2.56
Wood furniture	1 809.70	1 545.76	1 158.94	4 514.39	1.85	2.49
Total forest sector	4 674.86	3 394.55	2 031.06	10 100.46	1.73	2.16

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Southern Asia	**31 791.71**	**8 152.25**	**4 292.04**	**44 236.00**	**1.26**	**1.39**
India						
Forestry and logging	28 409.12	3 082.33	2 873.71	34 365.16	1.11	1.21
Solid wood products	576.76	793.41	234.11	1 604.28	2.38	2.78
Pulp and paper products	2 291.43	2 684.89	966.77	5 943.10	2.17	2.59
Wood furniture	514.40	1 027.45	308.83	1 850.69	3.00	3.60
Total forest sector	31 791.71	8 152.25	4 292.04	44 236.00	1.26	1.39
Western Asia	**16 407.72**	**11 190.29**	**6 410.34**	**34 008.36**	**1.57**	**2.04**
Cyprus						
Forestry and logging	8.62	3.43	2.45	14.50	1.40	1.68
Solid wood products	38.17	25.96	18.65	82.78	1.68	2.17
Pulp and paper products	19.18	14.43	12.42	46.03	1.75	2.40
Wood furniture	22.21	8.75	11.34	42.30	1.39	1.90
Total forest sector	88.19	38.34	39.52	166.05	1.43	1.88
Israel						
Forestry and logging	117.87	109.59	90.13	317.59	1.93	2.69
Solid wood products	163.28	171.24	158.19	492.72	2.05	3.02
Pulp and paper products	719.58	445.40	510.25	1 675.23	1.62	2.33
Wood furniture	891.83	466.83	595.46	1 954.12	1.52	2.19
Total forest sector	1 892.57	1 060.54	1 268.68	4 221.79	1.56	2.23
Saudi Arabia						
Solid wood products	872.99	536.77	509.18	1 918.94	1.61	2.20
Pulp and paper products	2 279.78	1 032.40	1 058.42	4 370.60	1.45	1.92
Wood furniture	1 529.74	1 084.51	993.37	3 607.62	1.71	2.36
Total forest sector	4 682.52	2 167.31	2 176.29	9 026.12	1.46	1.93
Türkiye						
Forestry and logging	962.31	351.67	95.82	1 409.80	1.37	1.47
Solid wood products	1 833.38	2 542.01	772.98	5 148.38	2.39	2.81

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products	3 236.70	3 475.42	1 350.09	8 062.21	2.07	2.49
Wood furniture	3 712.06	3 346.28	1 325.28	8 383.62	1.90	2.26
Total forest sector	9 744.45	7 924.11	2 925.85	20 594.40	1.81	2.11
Europe	**179 500.31**	**134 922.04**	**96 196.84**	**410 619.19**	**1.67**	**2.14**
Eastern Europe	**29 652.90**	**23 353.03**	**14 384.17**	**67 390.10**	**1.64**	**2.05**
Bulgaria						
Forestry and logging	232.94	116.75	18.01	367.70	1.50	1.58
Solid wood products	121.85	156.42	91.74	370.01	2.28	3.04
Pulp and paper products	177.40	146.85	90.92	415.17	1.83	2.34
Wood furniture	163.80	110.24	109.11	383.14	1.67	2.34
Total forest sector	695.99	428.74	325.59	1 450.31	1.62	2.08
Czechia						
Forestry and logging	1 151.85	705.31	282.87	2 140.02	1.61	1.86
Solid wood products	927.00	931.70	392.57	2 251.27	2.01	2.43
Pulp and paper products	708.17	525.19	293.80	1 527.15	1.74	2.16
Wood furniture	458.56	317.93	204.74	981.23	1.69	2.14
Total forest sector	3 245.57	1 731.34	1 048.13	6 025.04	1.53	1.86
Hungary						
Forestry and logging	234.43	88.39	25.26	348.09	1.38	1.48
Solid wood products	258.08	222.10	143.34	623.52	1.86	2.42
Pulp and paper products	469.72	329.68	232.47	1 031.87	1.70	2.20
Wood furniture	277.58	141.99	129.18	548.76	1.51	1.98
Total forest sector	1 239.82	678.16	492.96	2 410.94	1.55	1.94
Poland						
Forestry and logging	1 482.42	1 350.08	396.05	3 228.55	1.91	2.18
Solid wood products	2 199.50	2 425.78	1 104.18	5 729.45	2.10	2.60
Pulp and paper products	2 376.71	2 022.08	1 070.83	5 469.61	1.85	2.30

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Wood furniture	2 915.77	2 392.38	1 472.58	6 780.73	1.82	2.33
Total forest sector	8 974.40	6 626.27	3 724.01	19 324.68	1.74	2.15
Romania						
Forestry and logging	753.35	407.49	103.08	1 263.92	1.54	1.68
Solid wood products	980.32	1 101.00	495.87	2 577.19	2.12	2.63
Pulp and paper products	394.83	305.27	167.41	867.52	1.77	2.20
Wood furniture	1 038.04	608.34	499.16	2 145.54	1.59	2.07
Total forest sector	3 166.55	1 845.33	1 125.84	6 137.71	1.58	1.94
Russian Federation						
Forestry and logging	1 662.88	836.76	526.20	3 025.84	1.50	1.82
Solid wood products	3 218.04	5 204.81	3 114.53	11 537.37	2.62	3.59
Pulp and paper products	3 789.12	5 128.82	3 227.65	12 145.59	2.35	3.21
Wood furniture	1 819.89	4 034.73	2 235.98	8 090.60	3.22	4.45
Total forest sector	10 489.93	11 296.88	7 253.37	29 040.18	2.08	2.77
Slovakia						
Forestry and logging	549.12	157.79	64.96	771.87	1.29	1.41
Solid wood products	548.33	332.23	112.51	993.06	1.61	1.81
Pulp and paper products	409.43	398.67	161.46	969.56	1.97	2.37
Wood furniture	333.77	240.96	134.36	709.09	1.72	2.12
Total forest sector	1 840.65	746.32	414.27	3 001.24	1.41	1.63
Northern Europe	**54 209.09**	**33 639.59**	**28 800.29**	**116 648.97**	**1.61**	**2.10**
Denmark						
Forestry and logging	199.31	278.44	128.76	606.51	2.40	3.04
Solid wood products	604.47	453.82	429.61	1 487.90	1.75	2.46
Pulp and paper products	515.79	420.48	403.28	1 339.55	1.82	2.60
Wood furniture	971.60	572.74	538.88	2 083.22	1.59	2.14
Total forest sector	2 291.17	1 528.06	1 412.40	5 231.64	1.67	2.28

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Estonia						
Forestry and logging	287.46	145.44	59.34	492.24	1.51	1.71
Solid wood products	514.70	466.42	247.63	1 228.75	1.91	2.39
Pulp and paper products	69.57	53.76	32.09	155.42	1.77	2.23
Wood furniture	180.81	148.00	101.73	430.54	1.82	2.38
Total forest sector	1 052.54	589.96	389.43	2 031.93	1.56	1.93
Finland						
Forestry and logging	2 577.58	1 172.27	379.47	4 129.33	1.45	1.60
Solid wood products	1 230.74	2 272.19	1 004.94	4 507.86	2.85	3.66
Pulp and paper products	3 723.05	5 378.59	2 633.40	11 735.04	2.44	3.15
Wood furniture	463.38	343.92	308.91	1 116.21	1.74	2.41
Total forest sector	7 994.76	6 453.06	3 827.64	18 275.45	1.81	2.29
Iceland						
Forestry and logging	1.59	0.49	0.46	2.55	1.31	1.60
Solid wood products	6.91	5.38	4.39	16.68	1.78	2.41
Pulp and paper products	2.10	1.79	1.36	5.25	1.86	2.50
Wood furniture	13.45	8.04	7.38	28.88	1.60	2.15
Total forest sector	24.05	14.96	12.78	51.80	1.62	2.15
Ireland						
Forestry and logging	134.06	112.66	8.97	255.69	1.84	1.91
Solid wood products	344.53	197.76	118.74	661.03	1.57	1.92
Pulp and paper products	296.03	118.94	83.08	498.05	1.40	1.68
Wood furniture	7 900.52	1 129.08	2 235.42	11 265.02	1.14	1.43
Total forest sector	8 675.15	1 366.05	2 395.50	12 436.69	1.16	1.43
Latvia						
Forestry and logging	358.36	259.93	92.60	710.89	1.73	1.98
Solid wood products	551.26	647.98	309.81	1 509.05	2.18	2.74

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products	40.22	33.00	22.79	96.01	1.82	2.39
Wood furniture	107.48	78.77	61.91	248.17	1.73	2.31
Total forest sector	1 057.32	707.46	419.05	2 183.83	1.67	2.07
Lithuania						
Forestry and logging	165.64	93.96	51.79	311.39	1.57	1.88
Solid wood products	486.63	241.92	185.61	914.16	1.50	1.88
Pulp and paper products	212.36	66.07	63.68	342.12	1.31	1.61
Wood furniture	726.65	336.16	289.93	1 352.74	1.46	1.86
Total forest sector	1 591.28	543.51	520.22	2 655.01	1.34	1.67
Norway						
Forestry and logging	408.27	310.22	125.69	844.19	1.76	2.07
Solid wood products	990.67	1 106.04	842.72	2 939.42	2.12	2.97
Pulp and paper products	421.96	598.23	411.85	1 432.04	2.42	3.39
Wood furniture	376.04	337.44	311.14	1 024.62	1.90	2.72
Total forest sector	2 196.95	1 967.66	1 548.47	5 713.07	1.90	2.60
Sweden						
Forestry and logging	5 256.69	2 507.51	1 623.16	9 387.36	1.48	1.79
Solid wood products	2 474.48	3 518.72	1 764.26	7 757.46	2.42	3.13
Pulp and paper products	4 473.47	5 729.20	2 997.33	13 200.00	2.28	2.95
Wood furniture	1 198.73	1 016.61	750.04	2 965.38	1.85	2.47
Total forest sector	13 403.38	9 450.36	6 259.86	29 113.60	1.71	2.17
United Kingdom of Great Britain and Northern Ireland						
Forestry and logging	241.39	214.56	152.02	607.97	1.89	2.52
Solid wood products	4 862.92	3 919.34	4 011.15	12 793.41	1.81	2.63
Pulp and paper products	6 098.89	4 924.65	5 214.65	16 238.19	1.81	2.66
Wood furniture	4 719.31	3 014.94	3 442.06	11 176.30	1.64	2.37

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Total forest sector	15 922.50	11 018.51	12 014.94	38 955.95	1.69	2.45
Southern Europe	**30 859.86**	**26 906.23**	**16 538.36**	**74 304.46**	**1.72**	**2.20**
Croatia						
Forestry and logging	182.20	98.75	51.17	332.12	1.54	1.82
Solid wood products	248.84	288.57	208.08	745.48	2.16	3.00
Pulp and paper products	142.83	121.73	93.34	357.90	1.85	2.51
Wood furniture	158.68	127.88	107.94	394.50	1.81	2.49
Total forest sector	732.54	537.67	419.31	1 689.53	1.73	2.31
Greece						
Forestry and logging	55.43	19.42	1.25	76.10	1.35	1.37
Solid wood products	47.53	149.16	53.05	249.73	4.14	5.25
Pulp and paper products	318.56	446.47	266.78	1 031.81	2.40	3.24
Wood furniture	230.74	115.81	71.17	417.72	1.50	1.81
Total forest sector	652.25	645.66	370.17	1 668.08	1.99	2.56
Italy						
Forestry and logging	1 349.73	560.66	293.31	2 203.71	1.42	1.63
Solid wood products	3 950.50	4 314.58	2 419.60	10 684.67	2.09	2.70
Pulp and paper products	5 492.10	6 634.93	3 691.38	15 818.42	2.21	2.88
Wood furniture	6 240.72	6 821.09	4 054.06	17 115.87	2.09	2.74
Total forest sector	17 033.05	16 334.14	9 752.75	43 119.93	1.96	2.53
Malta						
Solid wood products	5.38	3.44	2.22	11.04	1.64	2.05
Wood furniture	21.10	8.57	11.07	40.75	1.41	1.93
Total forest sector	26.47	10.15	12.58	49.21	1.38	1.86
Portugal						
Forestry and logging	630.44	373.60	163.28	1 167.32	1.59	1.85
Solid wood products	969.50	827.29	473.65	2 270.44	1.85	2.34

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products	1 169.85	1 320.56	606.93	3 097.34	2.13	2.65
Wood furniture	675.43	517.87	394.62	1 587.92	1.77	2.35
Total forest sector	3 445.22	1 953.53	880.15	6 278.90	1.57	1.82
Slovenia						
Forestry and logging	203.44	93.93	18.17	315.54	1.46	1.55
Solid wood products	254.57	192.64	110.83	558.04	1.76	2.19
Pulp and paper products	236.21	193.15	109.54	538.90	1.82	2.28
Wood furniture	179.92	89.24	75.99	345.15	1.50	1.92
Total forest sector	874.14	497.86	293.17	1 665.17	1.57	1.90
Spain						
Forestry and logging	1 155.65	545.16	201.95	1 902.75	1.47	1.65
Solid wood products	1 783.38	2 429.79	1 511.28	5 724.45	2.36	3.21
Pulp and paper products	3 376.00	3 663.03	2 383.19	9 422.22	2.09	2.79
Wood furniture	1 781.16	1 349.14	1 027.88	4 158.19	1.76	2.33
Total forest sector	8 096.19	6 927.23	4 810.22	19 833.64	1.86	2.45
Western Europe	**64 778.45**	**51 023.19**	**36 474.02**	**152 275.66**	**1.72**	**2.21**
Austria						
Forestry and logging	1 128.67	702.14	128.41	1 959.22	1.62	1.74
Solid wood products	2 361.94	2 706.73	1 277.14	6 345.82	2.15	2.69
Pulp and paper products	2 051.37	1 786.76	1 016.79	4 854.91	1.87	2.37
Wood furniture	1 202.55	1 001.61	628.72	2 832.88	1.83	2.36
Total forest sector	6 744.52	5 007.62	2 864.73	14 616.87	1.74	2.17
Belgium						
Forestry and logging	131.25	129.11	33.05	293.40	1.98	2.24
Solid wood products	807.40	982.65	449.26	2 239.31	2.22	2.77
Pulp and paper products	1 534.17	1 432.78	733.03	3 699.99	1.93	2.41
Wood furniture	871.99	662.88	416.11	1 950.98	1.76	2.24
Total forest sector	3 344.81	2 937.27	1 568.26	7 850.34	1.88	2.35

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
France						
Forestry and logging	3 635.52	2 786.65	1 269.14	7 691.31	1.77	2.12
Solid wood products	3 186.35	4 496.85	3 025.66	10 708.85	2.41	3.36
Pulp and paper products	4 548.28	4 915.99	3 569.87	13 034.14	2.08	2.87
Wood furniture	2 441.06	1 924.46	1 714.18	6 079.69	1.79	2.49
Total forest sector	13 811.21	11 941.18	9 240.86	34 993.25	1.86	2.53
Germany						
Forestry and logging	2 875.81	3 057.26	1 243.20	7 176.27	2.06	2.50
Solid wood products	7 297.66	8 569.83	5 310.27	21 177.76	2.17	2.90
Pulp and paper products	11 472.19	10 272.11	6 724.03	28 468.33	1.90	2.48
Wood furniture	7 859.96	5 891.12	4 799.56	18 550.63	1.75	2.36
Total forest sector	29 505.61	24 377.42	17 053.04	70 936.07	1.83	2.40
Luxembourg						
Forestry and logging	6.89	3.22	0.27	10.39	1.47	1.51
Solid wood products	53.01	32.47	16.65	102.13	1.61	1.93
Wood furniture	8.55	2.80	1.90	13.25	1.33	1.55
Total forest sector	68.45	34.42	18.59	121.46	1.50	1.77
Netherlands						
Forestry and logging	111.93	76.72	30.17	218.82	1.69	1.95
Solid wood products	1 027.23	851.80	487.29	2 366.32	1.83	2.30
Pulp and paper products	2 171.97	2 014.11	1 240.09	5 426.17	1.93	2.50
Wood furniture	1 672.97	972.90	809.25	3 455.12	1.58	2.07
Total forest sector	4 984.09	3 648.82	2 450.11	11 083.03	1.73	2.22
Switzerland						
Forestry and logging	273.96	196.16	116.05	586.18	1.72	2.14
Solid wood products	3 700.16	1 903.49	2 024.28	7 627.93	1.51	2.06
Pulp and paper products	1 257.94	818.00	734.86	2 810.80	1.65	2.23

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Wood furniture	1 087.69	683.79	626.19	2 397.67	1.63	2.20
Total forest sector	6 319.75	3 076.45	3 278.44	12 674.64	1.49	2.01
Oceania	**9 728.23**	**9 080.40**	**9 359.05**	**28 167.68**	**1.90**	**2.88**
Australia and New Zealand	**9 728.23**	**9 080.40**	**9 359.05**	**28 167.68**	**1.90**	**2.88**
Australia						
Forestry and logging	822.63	923.07	865.02	2 610.72	2.12	3.17
Solid wood products	2 850.30	3 958.25	4 912.74	11 721.28	2.39	4.11
Pulp and paper products	2 035.93	2 525.08	2 446.56	7 007.56	2.24	3.44
Wood furniture	1 138.92	1 304.94	1 259.07	3 702.93	2.15	3.25
Total forest sector	6 847.77	6 680.76	6 484.11	20 012.64	1.98	2.92
New Zealand						
Forestry and logging	1 125.28	844.95	838.58	2 808.81	1.75	2.50
Solid wood products	866.00	1 318.98	1 292.38	3 477.36	2.52	4.02
Pulp and paper products	584.27	783.52	861.96	2 229.74	2.34	3.82
Wood furniture	304.92	306.72	354.78	966.41	2.01	3.17
Total forest sector	2 880.46	2 399.64	2 874.94	8 155.05	1.83	2.83
Grand Total	**623 768.19**	**516 649.21**	**305 649.19**	**1 446 066.59**	**1.65**	**2.12**

Source: Author calculations based on IMPLAN. 2021. *International IMPLAN data (model year 2015) and modeling software*. Huntersville, NC.

Note: Direct effects measure existing activities in the forest subsectors. Total effects = direct effects + indirect effects + induced effects. The direct effects across subsectors are additive but the total effects are not additive. For example, a portion of the indirect effects for the solid wood products manufacturing subsector is already included in the direct effects for the forestry and logging subsector. Summing the individual subsector indirect and induced impacts would result in double counting.

For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. Regional and subregional multipliers are simple averages across the study countries in the region or subregion.

Annex 3. Economic contribution of employment in the forest sector to the 62 study countries by subsector and effect type, 2015

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Africa	**383.01**	**274.01**	**245.64**	**902.67**	**1.44**	**1.84**
Northern Africa	**110.80**	**23.90**	**22.01**	**156.71**	**1.20**	**1.39**
Tunisia						
Forestry and logging	13.50	1.20	1.00	15.70	1.09	1.16
Solid wood products	12.40	11.27	6.21	29.88	1.91	2.41
Pulp and paper products	10.26	14.71	7.88	32.85	2.43	3.20
Wood furniture	26.13	16.00	14.47	56.59	1.61	2.17
Total forest sector	62.29	19.44	18.25	99.98	1.31	1.61
Morocco						
Forestry and logging	0.76	0.29	0.25	1.30	1.38	1.70
Solid wood products	12.30	2.00	0.57	14.87	1.16	1.21
Pulp and paper products	25.73	2.59	2.09	30.40	1.10	1.18
Wood furniture	9.72	2.39	1.25	13.36	1.25	1.37
Total forest sector	48.51	4.45	3.77	56.73	1.09	1.17
Sub-Saharan Africa	**272.21**	**250.11**	**223.63**	**745.95**	**1.92**	**2.74**
South Africa						
Forestry and logging	75.08	20.24	18.21	113.52	1.27	1.51
Solid wood products	49.15	52.48	47.54	149.17	2.07	3.04
Pulp and paper products	61.36	123.54	81.99	266.89	3.01	4.35
Wood furniture	86.62	151.28	121.23	359.13	2.75	4.15
Total forest sector	272.21	250.11	223.63	745.95	1.92	2.74

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Americas	**2 807.96**	**1 584.78**	**1 443.71**	**5 836.45**	**1.50**	**1.93**
Latin America and the Caribbean	**1 372.31**	**677.45**	**463.59**	**2 513.35**	**1.48**	**1.86**
Argentina						
Forestry and logging	0.21	1.59	2.39	4.18	8.75	20.36
Solid wood products	27.50	19.72	26.89	74.11	1.72	2.69
Pulp and paper products	65.76	56.20	66.38	188.34	1.85	2.86
Wood furniture	51.80	51.73	60.03	163.56	2.00	3.16
Total forest sector	145.27	110.13	143.15	398.55	1.76	2.74
Brazil						
Forestry and logging	129.49	17.81	8.15	155.45	1.14	1.20
Solid wood products	169.00	94.29	40.95	304.25	1.56	1.80
Pulp and paper products	188.00	332.70	154.13	674.84	2.77	3.59
Wood furniture	243.00	176.56	96.97	516.53	1.73	2.13
Total forest sector	729.49	347.78	193.85	1 271.12	1.48	1.74
Chile						
Forestry and logging	105.46	23.01	14.92	143.40	1.22	1.36
Solid wood products	45.94	75.26	25.24	146.44	2.64	3.19
Pulp and paper products	42.85	68.97	27.50	139.32	2.61	3.25
Wood furniture	10.96	6.72	4.22	21.90	1.61	2.00
Total forest sector	205.21	108.03	57.33	370.57	1.53	1.81
Colombia						
Forestry and logging	20.20	2.13	2.08	24.41	1.11	1.21
Solid wood products	6.85	13.68	5.14	25.68	3.00	3.75
Pulp and paper products	17.24	16.32	11.18	44.74	1.95	2.59
Wood furniture	18.27	17.71	12.42	48.40	1.97	2.65
Total forest sector	62.56	27.36	18.55	108.47	1.44	1.73
Costa Rica						
Forestry and logging	3.53	0.69	0.57	4.79	1.20	1.36
Solid wood products	4.17	3.93	2.37	10.48	1.94	2.51
Pulp and paper products	9.06	6.27	5.14	20.48	1.69	2.26
Wood furniture	39.75	31.91	25.20	96.86	1.80	2.44

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Total forest sector	56.52	34.24	26.16	116.92	1.61	2.07
Mexico						
Forestry and logging	10.17	0.39	0.24	10.79	1.04	1.06
Solid wood products	14.50	10.94	2.97	28.41	1.75	1.96
Pulp and paper products	71.00	97.31	30.43	198.74	2.37	2.80
Wood furniture	50.90	31.92	16.38	99.20	1.63	1.95
Total forest sector	146.57	41.85	18.96	207.38	1.29	1.41
Peru						
Forestry and logging	10.46	0.36	0.36	11.18	1.03	1.07
Solid wood products	2.93	3.36	0.88	7.17	2.15	2.45
Pulp and paper products	9.36	12.21	12.88	34.45	2.31	3.68
Wood furniture	3.94	1.88	1.36	7.19	1.48	1.82
Total forest sector	26.69	8.04	5.59	40.33	1.30	1.51
Northern America	**1 435.65**	**907.34**	**980.12**	**3 323.11**	**1.58**	**2.18**
Canada						
Forestry and logging	49.00	35.40	22.92	107.32	1.72	2.19
Solid wood products	97.00	125.23	89.38	311.61	2.29	3.21
Pulp and paper products	51.00	31.90	28.53	111.43	1.63	2.18
Wood furniture	76.00	21.05	24.99	122.05	1.28	1.61
Total forest sector	273.00	132.98	131.54	537.53	1.49	1.97
United States of America						
Forestry and logging	108.65	56.34	51.74	216.73	1.52	1.99
Solid wood products	370.00	343.57	306.74	1 020.31	1.93	2.76
Pulp and paper products	334.00	325.02	329.03	988.06	1.97	2.96
Wood furniture	350.00	191.69	220.94	762.63	1.55	2.18
Total forest sector	1 162.65	774.35	848.58	2 785.58	1.67	2.40
Asia	**9 426.45**	**3 440.27**	**2 067.62**	**14 934.34**	**1.28**	**1.52**
Central Asia	**30.64**	**4.93**	**7.97**	**43.53**	**1.16**	**1.42**
Kazakhstan						
Forestry and logging	17.87	1.04	1.21	20.12	1.06	1.13
Solid wood products	3.04	1.82	2.15	7.01	1.60	2.30

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Pulp and paper products	4.22	2.13	3.39	9.74	1.50	2.31
Wood furniture	5.50	1.62	3.91	11.03	1.30	2.01
Total forest sector	30.64	4.93	7.97	43.53	1.16	1.42
Eastern Asia	**5 768.52**	**2 680.07**	**1 527.41**	**9 975.99**	**1.40**	**1.63**
China						
Forestry and logging	1 015.00	84.49	136.61	1 236.10	1.08	1.22
Solid wood products	1 516.00	2 209.80	782.87	4 508.67	2.46	2.97
Pulp and paper products	1 390.00	3 083.96	1 461.37	5 935.33	3.22	4.27
Wood furniture	1 196.00	2 889.71	1 659.35	5 745.06	3.42	4.80
Total forest sector	5 117.00	2 428.76	1 385.56	8 931.32	1.47	1.75
Japan						
Forestry and logging	80.99	13.16	4.94	99.09	1.16	1.22
Solid wood products	95.50	110.01	58.10	263.61	2.15	2.76
Pulp and paper products	185.90	127.90	68.84	382.65	1.69	2.06
Wood furniture	100.00	79.21	25.16	204.37	1.79	2.04
Total forest sector	462.39	194.57	103.49	760.44	1.42	1.64
Republic of Korea						
Forestry and logging	22.63	2.60	1.58	26.80	1.11	1.18
Solid wood products	32.40	55.26	24.16	111.82	2.71	3.45
Pulp and paper products	72.60	64.31	43.72	180.64	1.89	2.49
Wood furniture	61.50	59.12	37.96	158.57	1.96	2.58
Total forest sector	189.13	56.75	38.35	284.23	1.30	1.50
South-eastern Asia	2 301.57	441.79	359.73	3 103.09	1.27	1.50
Brunei Darussalam						
Forestry and logging	0.56	0.15	0.14	0.85	1.26	1.51
Solid wood products	0.09	0.04	0.08	0.21	1.40	2.22
Total forest sector	0.65	0.18	0.21	1.04	1.27	1.60
Cambodia						
Forestry and logging	384.96	27.15	45.96	458.07	1.07	1.19
Solid wood products	2.26	2.24	1.34	5.84	1.99	2.59
Pulp and paper products	0.05	0.06	0.03	0.14	2.27	2.97

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Wood furniture	0.47	0.48	0.33	1.28	2.03	2.75
Total forest sector	387.73	23.00	32.65	443.38	1.06	1.14
Indonesia						
Forestry and logging	125.38	6.11	9.68	141.17	1.05	1.13
Solid wood products	243.00	158.71	65.93	467.64	1.65	1.92
Pulp and paper products	133.00	231.78	144.07	508.85	2.74	3.83
Wood furniture	167.00	146.38	86.31	399.69	1.88	2.39
Total forest sector	668.38	117.43	92.63	878.44	1.18	1.31
Malaysia						
Forestry and logging	42.19	5.00	4.26	51.45	1.12	1.22
Solid wood products	102.22	218.26	60.63	381.11	3.14	3.73
Pulp and paper products	43.45	58.13	23.60	125.19	2.34	2.88
Wood furniture	83.23	65.55	39.41	188.19	1.79	2.26
Total forest sector	271.10	84.16	63.08	418.34	1.31	1.54
Philippines						
Forestry and logging	10.46	0.83	1.30	12.60	1.08	1.20
Solid wood products	17.50	5.84	4.11	27.45	1.33	1.57
Pulp and paper products	22.70	14.43	15.77	52.90	1.64	2.33
Wood furniture	20.80	16.38	26.11	63.30	1.79	3.04
Total forest sector	71.46	16.58	15.49	103.53	1.23	1.45
Singapore						
Solid wood products	1.10	0.70	0.56	2.37	1.64	2.15
Pulp and paper products	3.96	1.90	1.82	7.68	1.48	1.94
Wood furniture	1.33	1.86	1.08	4.26	2.40	3.21
Total forest sector	6.39	4.37	3.38	14.14	1.68	2.21
Thailand						
Forestry and logging	10.46	0.41	0.51	11.39	1.04	1.09
Solid wood products	111.50	59.33	25.29	196.13	1.53	1.76
Pulp and paper products	78.20	45.68	40.19	164.07	1.58	2.10
Wood furniture	92.70	58.89	48.97	200.55	1.64	2.16
Total forest sector	292.86	51.08	39.54	383.48	1.17	1.31
Viet Nam						

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Forestry and logging	29.00	2.19	1.98	33.17	1.08	1.14
Solid wood products	126.40	168.23	77.92	372.55	2.33	2.95
Pulp and paper products	107.90	112.66	113.88	334.43	2.04	3.10
Wood furniture	339.70	240.36	305.82	885.88	1.71	2.61
Total forest sector	603.00	145.00	112.74	860.74	1.24	1.43
Southern Asia	**625.94**	**35.41**	**18.66**	**680.01**	**1.06**	**1.09**
India						
Forestry and logging	246.14	6.03	5.35	257.52	1.02	1.05
Solid wood products	83.70	41.17	6.71	131.57	1.49	1.57
Pulp and paper products	239.50	456.96	150.53	846.99	2.91	3.54
Wood furniture	56.60	28.06	8.95	93.61	1.50	1.65
Total forest sector	625.94	35.41	18.66	680.01	1.06	1.09
Western Asia	**699.79**	**278.07**	**153.86**	**1 131.72**	**1.30**	**1.59**
Cyprus						
Forestry and logging	0.32	0.05	0.05	0.42	1.17	1.31
Solid wood products	1.95	0.63	0.35	2.92	1.32	1.50
Pulp and paper products	0.75	0.21	0.23	1.19	1.28	1.59
Wood furniture	0.69	0.15	0.21	1.05	1.22	1.53
Total forest sector	3.70	0.61	0.73	5.04	1.17	1.36
Israel						
Forestry and logging	1.13	0.95	1.08	3.15	1.84	2.80
Solid wood products	3.09	1.70	1.85	6.64	1.55	2.15
Pulp and paper products	14.99	4.36	5.95	25.30	1.29	1.69
Wood furniture	17.59	4.98	6.92	29.49	1.28	1.68
Total forest sector	36.80	10.52	14.76	62.07	1.29	1.69
Saudi Arabia						
Solid wood products	23.41	13.11	12.56	49.07	1.56	2.10
Pulp and paper products	48.19	18.26	26.24	92.69	1.38	1.92
Wood furniture	40.06	19.92	24.60	84.58	1.50	2.11
Total forest sector	111.65	34.07	47.49	193.21	1.31	1.73
Türkiye						

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Forestry and logging	124.04	11.04	3.29	138.37	1.09	1.12
Solid wood products	139.73	120.43	32.24	292.41	1.86	2.09
Pulp and paper products	157.47	121.48	56.25	335.20	1.77	2.13
Wood furniture	126.39	118.97	55.45	300.81	1.94	2.38
Total forest sector	547.63	232.88	90.89	871.40	1.43	1.59
Europe	**4 195.12**	**1 807.81**	**1 371.55**	**7 374.48**	**1.40**	**1.74**
Eastern Europe	**1 794.51**	**636.50**	**485.21**	**2 916.22**	**1.31**	**1.59**
Bulgaria						
Forestry and logging	21.50	1.89	2.35	25.74	1.09	1.20
Solid wood products	15.28	14.94	14.87	45.10	1.98	2.95
Pulp and paper products	9.81	9.50	16.58	35.90	1.97	3.66
Wood furniture	19.87	7.60	23.65	51.12	1.38	2.57
Total forest sector	66.46	14.42	42.68	123.55	1.22	1.86
Czechia						
Forestry and logging	22.40	8.55	3.43	34.39	1.38	1.54
Solid wood products	31.40	16.51	6.03	53.94	1.53	1.72
Pulp and paper products	18.80	11.37	6.04	36.21	1.60	1.93
Wood furniture	20.70	9.50	5.81	36.01	1.46	1.74
Total forest sector	93.30	28.10	17.51	138.91	1.30	1.49
Hungary						
Forestry and logging	14.74	2.67	0.74	18.15	1.18	1.23
Solid wood products	21.79	8.46	5.43	35.68	1.39	1.64
Pulp and paper products	22.98	10.71	8.86	42.55	1.47	1.85
Wood furniture	16.80	4.66	4.92	26.38	1.28	1.57
Total forest sector	76.31	21.10	18.05	115.46	1.28	1.51
Poland						
Forestry and logging	46.60	7.17	2.14	55.92	1.15	1.20
Solid wood products	105.10	89.37	31.27	225.75	1.85	2.15
Pulp and paper products	55.10	44.53	26.35	125.98	1.81	2.29
Wood furniture	156.10	98.74	68.16	323.00	1.63	2.07
Total forest sector	362.90	130.70	83.29	576.89	1.36	1.59
Romania						

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Forestry and logging	253.21	14.05	3.25	270.51	1.06	1.07
Solid wood products	69.15	111.48	23.85	204.49	2.61	2.96
Pulp and paper products	11.54	15.21	8.08	34.82	2.32	3.02
Wood furniture	70.72	28.44	24.01	123.17	1.40	1.74
Total forest sector	404.62	67.89	38.41	510.92	1.17	1.26
Russian Federation						
Forestry and logging	290.15	33.12	24.36	347.64	1.11	1.20
Solid wood products	198.50	349.01	172.48	719.99	2.76	3.63
Pulp and paper products	121.00	143.22	106.13	370.35	2.18	3.06
Wood furniture	127.20	202.51	140.72	470.43	2.59	3.70
Total forest sector	736.85	355.71	274.47	1 367.03	1.48	1.86
Slovakia						
Forestry and logging	13.76	3.97	1.62	19.36	1.29	1.41
Solid wood products	17.60	8.59	2.92	29.12	1.49	1.65
Pulp and paper products	10.59	9.93	4.24	24.76	1.94	2.34
Wood furniture	12.12	6.13	3.55	21.80	1.51	1.80
Total forest sector	54.07	18.58	10.80	83.45	1.34	1.54
Northern Europe	733.18	330.51	304.64	1 368.33	1.44	1.87
Denmark						
Forestry and logging	4.52	1.99	1.17	7.68	1.44	1.70
Solid wood products	7.18	4.32	3.92	15.41	1.60	2.15
Pulp and paper products	6.44	3.38	3.68	13.51	1.52	2.10
Wood furniture	6.84	5.09	4.94	16.88	1.74	2.47
Total forest sector	24.99	12.61	12.77	50.36	1.50	2.02
Estonia						
Forestry and logging	10.22	3.22	1.59	15.03	1.31	1.47
Solid wood products	15.15	11.83	7.20	34.19	1.78	2.26
Pulp and paper products	2.70	1.22	0.94	4.86	1.45	1.80
Wood furniture	8.32	3.54	2.97	14.83	1.43	1.78
Total forest sector	36.39	12.94	11.15	60.49	1.36	1.66
Finland						

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Forestry and logging	56.73	10.47	3.49	70.69	1.18	1.25
Solid wood products	20.52	31.55	10.56	62.63	2.54	3.05
Pulp and paper products	27.46	56.05	28.30	111.80	3.04	4.07
Wood furniture	6.86	3.42	3.28	13.56	1.50	1.98
Total forest sector	111.57	55.93	39.70	207.19	1.50	1.86
Iceland						
Forestry and logging	0.01	0.00	0.00	0.02	1.31	1.62
Solid wood products	0.09	0.05	0.04	0.19	1.61	2.08
Pulp and paper products	0.03	0.02	0.01	0.06	1.72	2.20
Wood furniture	0.17	0.09	0.07	0.32	1.51	1.93
Total forest sector	0.30	0.16	0.12	0.58	1.52	1.93
Ireland						
Forestry and logging	5.82	0.54	-0.02	6.35	1.09	1.09
Solid wood products	3.64	2.10	0.92	6.65	1.58	1.83
Pulp and paper products	2.92	0.45	0.66	4.03	1.15	1.38
Wood furniture	8.98	7.32	17.96	34.27	1.82	3.82
Total forest sector	21.36	7.86	18.51	47.73	1.37	2.23
Latvia						
Forestry and logging	24.00	7.60	2.55	34.14	1.32	1.42
Solid wood products	19.92	24.97	10.17	55.05	2.25	2.76
Pulp and paper products	1.63	0.97	0.76	3.35	1.59	2.06
Wood furniture	5.66	2.42	2.06	10.14	1.43	1.79
Total forest sector	51.21	20.87	13.10	85.18	1.41	1.66
Lithuania						
Forestry and logging	14.07	2.46	1.78	18.31	1.18	1.30
Solid wood products	20.87	9.33	6.53	36.73	1.45	1.76
Pulp and paper products	5.34	1.87	2.25	9.47	1.35	1.77
Wood furniture	22.32	10.49	10.28	43.09	1.47	1.93
Total forest sector	62.61	15.14	17.66	95.40	1.24	1.52
Norway						
Forestry and logging	4.54	2.10	1.00	7.63	1.46	1.68

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Solid wood products	14.77	9.14	6.82	30.73	1.62	2.08
Pulp and paper products	5.31	4.53	3.34	13.17	1.85	2.48
Wood furniture	4.30	2.76	2.51	9.57	1.64	2.23
Total forest sector	28.92	14.94	12.37	56.23	1.52	1.94
Sweden						
Forestry and logging	95.85	19.84	16.31	132.00	1.21	1.38
Solid wood products	27.97	40.66	18.24	86.87	2.45	3.11
Pulp and paper products	37.45	52.28	31.32	121.05	2.40	3.23
Wood furniture	15.63	9.18	7.81	32.62	1.59	2.09
Total forest sector	176.89	75.75	64.19	316.83	1.43	1.79
United Kingdom of Great Britain and Northern Ireland						
Forestry and logging	18.84	6.19	4.66	29.70	1.33	1.58
Solid wood products	66.60	30.43	28.37	125.40	1.46	1.88
Pulp and paper products	56.20	43.57	42.58	142.34	1.78	2.53
Wood furniture	77.30	46.81	47.32	171.43	1.61	2.22
Total forest sector	218.94	114.31	115.08	448.33	1.52	2.05
Southern Europe	714.82	319.41	202.63	1 236.87	1.35	1.59
Croatia						
Forestry and logging	20.52	2.55	1.45	24.52	1.12	1.19
Solid wood products	17.43	10.81	6.24	34.48	1.62	1.98
Pulp and paper products	4.61	3.49	2.80	10.91	1.76	2.37
Wood furniture	10.33	3.55	3.23	17.10	1.34	1.66
Total forest sector	52.89	14.03	11.51	78.42	1.27	1.48
Greece						
Forestry and logging	3.77	0.37	0.00	4.15	1.10	1.10
Solid wood products	10.61	4.63	1.05	16.30	1.44	1.54
Pulp and paper products	13.69	9.45	5.32	28.46	1.69	2.08
Wood furniture	7.16	2.73	1.42	11.31	1.38	1.58
Total forest sector	35.23	12.79	6.73	54.75	1.36	1.55
Italy						

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Forestry and logging	38.60	8.37	4.32	51.29	1.22	1.33
Solid wood products	69.30	41.96	22.38	133.65	1.61	1.93
Pulp and paper products	65.80	64.25	36.46	166.51	1.98	2.53
Wood furniture	107.00	80.78	48.30	236.08	1.75	2.21
Total forest sector	280.70	171.71	105.09	557.50	1.61	1.99
Malta						
Solid wood products	0.25	0.09	0.04	0.38	1.36	1.52
Wood furniture	0.68	0.17	0.20	1.05	1.25	1.55
Total forest sector	0.93	0.20	0.22	1.35	1.21	1.45
Portugal						
Forestry and logging	79.86	7.45	3.10	90.42	1.09	1.13
Solid wood products	30.47	34.64	10.24	75.35	2.14	2.47
Pulp and paper products	21.74	45.22	13.15	80.11	3.08	3.68
Wood furniture	25.42	11.99	8.53	45.94	1.47	1.81
Total forest sector	157.49	14.09	6.07	177.65	1.09	1.13
Slovenia						
Forestry and logging	20.50	1.88	0.29	22.67	1.09	1.11
Solid wood products	7.75	5.51	2.40	15.65	1.71	2.02
Pulp and paper products	5.52	3.78	2.38	11.68	1.68	2.12
Wood furniture	5.10	1.82	1.64	8.55	1.36	1.68
Total forest sector	38.87	9.51	5.70	54.08	1.24	1.39
Spain						
Forestry and logging	20.40	6.17	2.04	28.61	1.30	1.40
Solid wood products	40.50	34.63	19.68	94.82	1.86	2.34
Pulp and paper products	41.70	41.60	27.28	110.58	2.00	2.65
Wood furniture	46.10	30.66	23.12	99.88	1.67	2.17
Total forest sector	148.70	97.09	67.31	313.10	1.65	2.11
Western Europe	**952.60**	**521.39**	**379.07**	**1 853.06**	**1.51**	**1.86**
Austria						
Forestry and logging	50.40	7.35	1.20	58.95	1.15	1.17
Solid wood products	30.49	44.28	14.46	89.23	2.45	2.93

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Pulp and paper products	19.71	20.65	11.58	51.94	2.05	2.63
Wood furniture	16.27	10.97	7.16	34.40	1.67	2.11
Total forest sector	116.87	54.08	32.19	203.14	1.46	1.74
Belgium						
Forestry and logging	2.51	1.09	0.34	3.93	1.44	1.57
Solid wood products	12.22	9.44	4.66	26.32	1.77	2.15
Pulp and paper products	18.87	12.74	7.61	39.21	1.68	2.08
Wood furniture	11.16	6.41	4.32	21.88	1.57	1.96
Total forest sector	44.75	26.52	16.23	87.50	1.59	1.96
France						
Forestry and logging	29.00	11.89	5.70	46.59	1.41	1.61
Solid wood products	57.10	49.35	30.49	136.94	1.86	2.40
Pulp and paper products	64.40	49.50	38.43	152.33	1.77	2.37
Wood furniture	41.60	28.33	26.60	96.53	1.68	2.32
Total forest sector	192.10	105.67	87.71	385.48	1.55	2.01
Germany						
Forestry and logging	37.00	15.37	5.71	58.07	1.42	1.57
Solid wood products	128.10	122.48	69.03	319.62	1.96	2.50
Pulp and paper products	144.30	105.02	69.61	318.93	1.73	2.21
Wood furniture	132.40	87.70	70.59	290.68	1.66	2.20
Total forest sector	441.80	270.39	189.66	901.84	1.61	2.04
Luxembourg						
Forestry and logging	0.21	0.02	0.00	0.23	1.12	1.12
Solid wood products	0.26	0.30	0.12	0.68	2.12	2.57
Wood furniture	0.03	0.02	0.01	0.07	1.70	2.13
Total forest sector	0.50	0.26	0.13	0.89	1.51	1.76
Netherlands						
Forestry and logging	1.77	0.84	0.34	2.95	1.48	1.67
Solid wood products	13.07	11.06	5.52	29.65	1.85	2.27
Pulp and paper products	27.65	23.03	14.06	64.74	1.83	2.34
Wood furniture	32.57	11.68	9.10	53.35	1.36	1.64

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	----------		thousand jobs	----------		
Total forest sector	75.06	42.75	27.46	145.27	1.57	1.94
Switzerland						
Forestry and logging	10.16	1.36	0.91	12.43	1.13	1.22
Solid wood products	47.66	17.84	16.47	81.97	1.37	1.72
Pulp and paper products	14.64	6.15	5.99	26.78	1.42	1.83
Wood furniture	9.06	5.32	5.10	19.48	1.59	2.15
Total forest sector	81.51	21.74	25.69	128.94	1.27	1.58
Oceania	**135.54**	**74.51**	**78.12**	**288.17**	**1.57**	**2.19**
Australia and New Zealand	**135.54**	**74.51**	**78.12**	**288.17**	**1.57**	**2.19**
Australia						
Forestry and logging	9.89	2.55	2.18	14.63	1.26	1.48
Solid wood products	41.00	38.29	43.99	123.28	1.93	3.01
Pulp and paper products	16.00	13.31	12.56	41.87	1.83	2.62
Wood furniture	23.00	5.95	5.32	34.27	1.26	1.49
Total forest sector	89.89	46.56	42.96	179.41	1.52	2.00
New Zealand						
Forestry and logging	20.48	9.57	10.42	40.47	1.47	1.98
Solid wood products	12.58	17.83	15.93	46.34	2.42	3.68
Pulp and paper products	8.92	9.18	10.67	28.77	2.03	3.23
Wood furniture	3.68	3.87	4.36	11.91	2.05	3.24
Total forest sector	45.65	27.95	35.16	108.76	1.61	2.38
Grand Total	16 948.08	7 181.38	5 206.64	29 336.11	1.39	1.73

Sources: Author calculations based on UNIDO. 2021. *International Yearbook of Industrial Statistics 2021*. USA: Northampton, MA. Edward Elgar Publishing, Inc.; ILO. 2021. *ILOSTAT: employment by sex and economic activity*. https://ilostat.ilo.org/data/. Cited 10 October 2021; UNSD. 2021. *Employed population by status in employment, industry and sex*. http://data.un.org. Cited 10 October 2021.

Note: Direct effects measure existing activities in the forest subsectors. Total effects = direct effects + indirect effects + induced effects. The direct effects across subsectors are additive but the total effects are not additive. For example, a portion of the indirect effects for the solid wood products manufacturing subsector is already included in the direct effects for the forestry and logging subsector. Summing the individual subsector indirect and induced impacts would result in double counting.

For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. Regional and subregional multipliers are simple averages across the study countries in the region or subregion.

Annex 4. Economic contribution of labour income earned in the forest sector to the 62 study countries by subsector and effect type, 2015

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Africa	**3 260.76**	**3 011.03**	**2 830.45**	**9 102.23**	**1.66**	**2.28**
Northern Africa	**566.89**	**264.67**	**262.52**	**1 094.07**	**1.48**	**1.93**
Tunisia						
Forestry and logging	18.09	8.05	8.74	34.87	1.44	1.93
Solid wood products	95.06	33.13	45.45	173.65	1.35	1.83
Pulp and paper products	78.63	85.21	57.66	221.50	2.08	2.82
Wood furniture	200.29	105.43	105.77	411.50	1.53	2.05
Total forest sector	392.08	176.68	188.27	757.02	1.45	1.93
Morocco						
Forestry and logging	11.04	8.20	5.18	24.42	1.74	2.21
Solid wood products	15.66	22.02	11.81	49.49	2.41	3.16
Pulp and paper products	97.70	49.09	43.36	190.14	1.50	1.95
Wood furniture	50.41	36.86	26.34	113.61	1.73	2.25
Total forest sector	174.81	87.99	74.25	337.05	1.50	1.93
Sub-Saharan Africa	2 693.87	2 746.36	2 567.93	8 008.16	2.02	2.97
South Africa						
Forestry and logging	175.94	287.48	216.82	680.24	2.63	3.87

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Solid wood products	627.76	448.05	521.15	1 596.96	1.71	2.54
Pulp and paper products	783.76	1 106.10	907.27	2 797.12	2.41	3.57
Wood furniture	1 106.41	1 665.29	1 343.54	4 115.25	2.51	3.72
Total forest sector	2 693.87	2 746.36	2 567.93	8 008.16	2.02	2.97
Americas	**27 174.84**	**22 516.16**	**18 638.32**	**68 329.33**	**1.86**	**2.52**
Latin America and the Caribbean	**12 289.20**	**11 761.97**	**7 490.04**	**31 541.20**	**1.89**	**2.52**
Argentina						
Forestry and logging	63.01	46.58	42.19	151.79	1.74	2.41
Solid wood products	701.68	476.16	501.20	1 679.05	1.68	2.39
Pulp and paper products	1 677.97	1 306.73	1 231.72	4 216.42	1.78	2.51
Wood furniture	1 321.75	1 336.69	1 117.40	3 775.83	2.01	2.86
Total forest sector	3 764.41	2 499.89	2 471.83	8 736.14	1.66	2.32
Brazil						
Forestry and logging	71.61	134.77	48.66	255.04	2.88	3.56
Solid wood products	1 166.55	1 219.84	651.60	3 038.00	2.05	2.60
Pulp and paper products	2 388.71	3 591.30	1 566.08	7 546.09	2.50	3.16
Wood furniture	1 740.96	2 234.57	1 061.21	5 036.74	2.28	2.89
Total forest sector	5 367.82	6 306.09	3 013.17	14 687.09	2.17	2.74
Chile						
Forestry and logging	406.08	338.42	235.29	979.79	1.83	2.41
Solid wood products	436.35	689.42	371.75	1 497.52	2.58	3.43
Pulp and paper products	406.97	833.45	405.65	1 646.07	3.05	4.04
Wood furniture	104.07	89.77	62.45	256.29	1.86	2.46
Total forest sector	1 353.47	1 511.22	907.61	3 772.30	2.12	2.79

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Colombia						
Forestry and logging	25.45	10.94	13.85	50.24	1.43	1.97
Solid wood products	27.48	34.72	27.14	89.34	2.26	3.25
Pulp and paper products	131.69	128.57	113.19	373.46	1.98	2.84
Wood furniture	70.97	75.56	64.16	210.68	2.06	2.97
Total forest sector	255.59	199.76	185.93	641.28	1.78	2.51
Costa Rica						
Forestry and logging	14.06	9.66	10.43	34.15	1.69	2.43
Solid wood products	46.24	36.90	39.27	122.42	1.80	2.65
Pulp and paper products	100.44	82.47	85.92	268.84	1.82	2.68
Wood furniture	440.49	496.73	423.24	1 360.47	2.13	3.09
Total forest sector	601.24	565.34	511.19	1 677.77	1.94	2.79
Mexico						
Forestry and logging	8.94	3.63	2.93	15.50	1.41	1.73
Solid wood products	76.98	41.55	28.83	147.36	1.54	1.91
Pulp and paper products	737.94	974.31	420.96	2 133.20	2.32	2.89
Wood furniture	0.35	0.24	0.14	0.73	1.70	2.11
Total forest sector	824.20	576.84	332.62	1 733.65	1.70	2.10
Peru						
Forestry and logging	5.07	2.56	2.28	9.91	1.50	1.95
Solid wood products	14.26	15.72	9.55	39.53	2.10	2.77
Pulp and paper products	77.94	58.52	43.21	179.67	1.75	2.31
Wood furniture	25.18	34.62	18.54	78.34	2.37	3.11
Total forest sector	122.46	102.83	67.69	292.98	1.84	2.39

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Northern America	**14 885.64**	**10 754.19**	**11 148.29**	**36 788.12**	**1.75**	**2.54**
Canada						
Forestry and logging	875.53	1 547.39	968.98	3 391.90	2.77	3.87
Solid wood products	3 651.79	3 560.87	2 931.91	10 144.57	1.98	2.78
Pulp and paper products	2 704.25	2 081.20	1 938.43	6 723.88	1.77	2.49
Wood furniture	2 514.27	1 248.97	1 483.03	5 246.27	1.50	2.09
Total forest sector	9 745.85	6 477.54	6 401.04	22 624.42	1.66	2.32
United States of America						
Forestry and logging	2 637.26	3 897.15	3 449.01	9 983.41	2.48	3.79
Solid wood products	1 002.58	1 090.87	1 084.40	3 177.86	2.09	3.17
Pulp and paper products	944.00	933.18	963.03	2 840.21	1.99	3.01
Wood furniture	555.96	411.90	490.65	1 458.51	1.74	2.62
Total forest sector	5 139.80	4 276.65	4 747.25	14 163.70	1.83	2.76
Asia	**59 106.17**	**58 098.07**	**29 735.82**	**146 940.06**	**1.60**	**2.05**
Central Asia	**158.36**	**52.54**	**74.27**	**285.17**	**1.33**	**1.80**
Kazakhstan						
Forestry and logging	20.84	11.75	11.26	43.85	1.56	2.10
Solid wood products	32.80	8.94	15.77	57.52	1.27	1.75
Pulp and paper products	45.48	20.14	24.83	90.45	1.44	1.99
Wood furniture	59.24	17.32	28.56	105.12	1.29	1.77
Total forest sector	158.36	52.54	74.27	285.17	1.33	1.80
Eastern Asia	**45 298.13**	**49 573.25**	**23 657.50**	**118 528.88**	**1.98**	**2.52**
China						
Forestry and logging	4 342.17	863.48	4 379.73	9 585.38	1.20	2.21
Solid wood products	9 660.07	34 476.84	30 825.75	74 962.67	4.57	7.76

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Pulp and paper products	10 170.23	37 664.28	19 809.94	67 644.45	4.70	6.65
Wood furniture	8 842.73	15 303.00	11 925.91	36 071.64	2.73	4.08
Total forest sector	33 015.20	39 225.78	17 489.04	89 730.02	2.19	2.72
Japan						
Forestry and logging	269.12	279.25	118.17	666.54	2.04	2.48
Solid wood products	1 487.06	985.07	587.66	3 059.79	1.66	2.06
Pulp and paper products	4 345.53	1 684.14	3 042.61	9 072.28	1.39	2.09
Wood furniture	1 396.19	4 988.73	1 499.15	7 884.07	4.57	5.65
Total forest sector	7 497.90	5 258.65	2 923.27	15 679.82	1.70	2.09
Republic of Korea						
Forestry and logging	61.55	74.00	47.59	183.15	2.20	2.98
Solid wood products	859.30	1 019.41	627.00	2 505.70	2.19	2.92
Pulp and paper products	2 202.17	1 842.47	1 567.07	5 611.71	1.84	2.55
Wood furniture	1 662.01	3 008.13	626.36	5 296.50	2.81	3.19
Total forest sector	4 785.03	5 088.82	3 245.18	13 119.04	2.06	2.74
South-eastern Asia	**6 588.04**	**3 306.16**	**2 500.70**	**12 394.91**	**1.45**	**1.80**
Brunei Darussalam						
Forestry and logging	7.15	3.99	2.05	13.18	1.56	1.84
Solid wood products	5.09	0.82	1.12	7.02	1.16	1.38
Total forest sector	12.23	4.64	3.10	19.97	1.38	1.63
Cambodia						
Forestry and logging	214.50	34.85	64.93	314.28	1.16	1.47
Solid wood products	2.84	1.40	1.27	5.51	1.49	1.94
Pulp and paper products	0.06	0.05	0.03	0.14	1.79	2.32

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Wood furniture	0.59	0.48	0.32	1.38	1.81	2.35
Total forest sector	217.98	28.66	45.00	291.65	1.13	1.34
Indonesia						
Forestry and logging	69.34	15.62	22.20	107.15	1.23	1.55
Solid wood products	516.98	498.09	356.81	1 371.89	1.96	2.65
Pulp and paper products	461.56	549.48	286.19	1 297.23	2.19	2.81
Wood furniture	332.73	445.81	197.39	975.93	2.34	2.93
Total forest sector	1 380.60	676.55	571.72	2 628.86	1.49	1.90
Malaysia						
Forestry and logging	119.32	38.57	34.86	192.75	1.32	1.62
Solid wood products	585.58	554.99	282.21	1 422.79	1.95	2.43
Pulp and paper products	399.69	317.68	177.03	894.41	1.79	2.24
Wood furniture	470.62	270.32	181.15	922.08	1.57	1.96
Total forest sector	1 575.22	575.21	483.95	2 634.38	1.37	1.67
Philippines						
Forestry and logging	14.60	2.50	4.46	21.55	1.17	1.48
Solid wood products	52.85	43.35	36.54	132.74	1.82	2.51
Pulp and paper products	102.81	7.58	105.64	216.03	1.07	2.10
Wood furniture	78.06	27.25	37.39	142.70	1.35	1.83
Total forest sector	248.32	89.45	91.09	428.86	1.36	1.73
Singapore						
Solid wood products	53.46	32.84	21.87	108.18	1.61	2.02
Pulp and paper products	192.26	85.77	71.05	349.08	1.45	1.82
Wood furniture	64.48	84.72	40.78	189.98	2.31	2.95

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Total forest sector	310.20	200.51	130.91	641.63	1.65	2.07
Thailand						
Forestry and logging	9.51	2.00	3.04	14.55	1.21	1.53
Solid wood products	277.74	260.54	178.46	716.74	1.94	2.58
Pulp and paper products	351.18	266.40	214.38	831.96	1.76	2.37
Wood furniture	349.83	290.55	221.50	861.89	1.83	2.46
Total forest sector	988.26	557.46	452.42	1 998.14	1.56	2.02
Viet Nam						
Forestry and logging	21.11	9.44	6.54	37.09	1.45	1.76
Solid wood products	335.52	701.43	327.33	1 364.28	3.09	4.07
Pulp and paper products	376.59	342.13	229.80	948.52	1.91	2.52
Wood furniture	1 122.02	829.58	614.64	2 566.23	1.74	2.29
Total forest sector	1 855.23	1 173.68	722.51	3 751.42	1.63	2.02
Southern Asia	**1 137.76**	**594.18**	**414.90**	**2 146.84**	**1.52**	**1.89**
India						
Forestry and logging	42.83	10.71	13.31	66.85	1.25	1.56
Solid wood products	177.64	206.16	109.52	493.32	2.16	2.78
Pulp and paper products	700.46	1 371.69	970.02	3 042.17	2.96	4.34
Wood furniture	216.83	583.77	353.00	1 153.59	3.69	5.32
Total forest sector	1 137.76	594.18	414.90	2 146.84	1.52	1.89
Western Asia	**5 923.87**	**4 571.94**	**3 088.45**	**13 584.26**	**1.71**	**2.29**
Cyprus						
Forestry and logging	1.82	2.70	1.81	6.33	2.48	3.47
Solid wood products	17.82	13.99	13.51	45.31	1.78	2.54
Pulp and paper products	9.69	11.72	8.98	30.39	2.21	3.14

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Wood furniture	12.39	7.28	8.21	27.88	1.59	2.25
Total forest sector	41.72	31.38	30.44	103.54	1.75	2.48
Israel						
Forestry and logging	65.68	77.07	51.39	194.14	2.17	2.96
Solid wood products	119.32	112.46	89.11	320.89	1.94	2.69
Pulp and paper products	453.97	299.43	286.62	1 040.02	1.66	2.29
Wood furniture	553.63	327.32	333.36	1 214.31	1.59	2.19
Total forest sector	1 192.60	729.11	712.09	2 633.80	1.61	2.21
Saudi Arabia						
Solid wood products	426.24	88.34	193.05	707.63	1.21	1.66
Pulp and paper products	877.39	185.67	406.02	1 469.08	1.21	1.67
Wood furniture	729.43	239.14	382.42	1 350.99	1.33	1.85
Total forest sector	2 033.06	438.27	916.87	3 388.20	1.22	1.67
Türkiye						
Forestry and logging	35.44	145.67	47.94	229.04	5.11	6.46
Solid wood products	527.58	850.84	334.35	1 712.77	2.61	3.25
Pulp and paper products	1 057.11	1 354.61	578.38	2 990.10	2.28	2.83
Wood furniture	1 036.34	1 374.20	572.18	2 982.72	2.33	2.88
Total forest sector	2 656.47	3 373.18	1 429.06	7 458.71	2.27	2.81
Europe	**86 328.42**	**66 423.03**	**46 470.04**	**199 221.49**	**1.74**	**2.25**
Eastern Europe	**9 310.02**	**8 599.47**	**5 792.69**	**23 702.18**	**1.79**	**2.33**
Bulgaria						
Forestry and logging	14.73	18.26	1.80	34.79	2.24	2.36
Solid wood products	53.62	50.51	36.28	140.41	1.94	2.62

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Pulp and paper products	51.58	58.40	41.97	151.94	2.13	2.95
Wood furniture	72.55	39.69	43.52	155.75	1.55	2.15
Total forest sector	192.46	137.49	112.90	442.85	1.71	2.30
Czechia						
Forestry and logging	207.63	181.11	68.46	457.20	1.87	2.20
Solid wood products	299.85	344.89	158.63	803.37	2.15	2.68
Pulp and paper products	239.85	183.81	111.78	535.44	1.77	2.23
Wood furniture	198.71	126.39	85.46	410.56	1.64	2.07
Total forest sector	946.04	589.11	363.19	1 898.34	1.62	2.01
Hungary						
Forestry and logging	66.59	55.43	14.32	136.33	1.83	2.05
Solid wood products	165.82	123.62	85.48	374.91	1.75	2.26
Pulp and paper products	261.35	197.40	139.05	597.80	1.76	2.29
Wood furniture	164.23	91.42	77.28	332.93	1.56	2.03
Total forest sector	657.98	419.18	299.73	1 376.88	1.64	2.09
Poland						
Forestry and logging	71.35	115.19	37.93	224.47	2.61	3.15
Solid wood products	888.18	1 005.60	584.93	2 478.71	2.13	2.79
Pulp and paper products	711.50	694.95	445.37	1 851.81	1.98	2.60
Wood furniture	1 406.02	1 103.89	783.80	3 293.71	1.79	2.34
Total forest sector	3 077.05	2 497.26	1 674.95	7 249.27	1.81	2.36
Romania						
Forestry and logging	96.67	186.56	45.74	328.98	2.93	3.40
Solid wood products	356.61	451.10	231.46	1 039.17	2.26	2.91

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Pulp and paper products	122.18	141.74	78.60	342.52	2.16	2.80
Wood furniture	484.21	307.79	233.06	1 025.06	1.64	2.12
Total forest sector	1 059.67	911.69	542.51	2 513.87	1.86	2.37
Russian Federation						
Forestry and logging	271.29	287.99	212.22	771.50	2.06	2.84
Solid wood products	1 002.58	1 484.94	1 035.65	3 523.17	2.48	3.51
Pulp and paper products	944.00	1 436.70	984.76	3 365.46	2.52	3.57
Wood furniture	555.96	1 224.18	731.63	2 511.77	3.20	4.52
Total forest sector	2 773.83	3 701.84	2 594.00	9 069.67	2.33	3.27
Slovakia						
Forestry and logging	110.50	73.69	31.05	215.24	1.67	1.95
Solid wood products	132.59	111.77	54.57	298.93	1.84	2.25
Pulp and paper products	183.86	156.64	78.68	419.18	1.85	2.28
Wood furniture	176.03	109.02	65.75	350.81	1.62	1.99
Total forest sector	602.98	342.90	205.41	1 151.30	1.57	1.91
Northern Europe	**28 277.79**	**19 524.01**	**15 052.60**	**62 854.41**	**1.71**	**2.24**
Denmark						
Forestry and logging	70.21	199.28	81.09	350.57	3.84	4.99
Solid wood products	414.88	297.98	268.83	981.69	1.72	2.37
Pulp and paper products	387.46	276.14	252.55	916.16	1.71	2.36
Wood furniture	503.58	402.05	338.41	1 244.04	1.80	2.47
Total forest sector	1 376.13	1 052.33	888.82	3 317.28	1.76	2.41
Estonia						
Forestry and logging	100.88	89.38	35.28	225.54	1.89	2.24

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Solid wood products	292.58	254.85	150.93	698.36	1.87	2.39
Pulp and paper products	38.60	29.97	19.62	88.19	1.78	2.28
Wood furniture	129.68	90.14	62.08	281.91	1.70	2.17
Total forest sector	561.74	355.63	238.87	1 156.24	1.63	2.06
Finland						
Forestry and logging	618.70	818.85	217.58	1 655.13	2.32	2.68
Solid wood products	874.25	1 188.81	606.33	2 669.39	2.36	3.05
Pulp and paper products	1 909.60	3 228.27	1 609.69	6 747.56	2.69	3.53
Wood furniture	342.49	229.44	187.26	759.19	1.67	2.22
Total forest sector	3 745.05	4 276.13	2 349.80	10 370.98	2.14	2.77
Iceland						
Forestry and logging	0.43	0.33	0.25	1.00	1.77	2.34
Solid wood products	3.75	3.12	2.29	9.15	1.83	2.44
Pulp and paper products	1.11	1.05	0.70	2.86	1.94	2.57
Wood furniture	6.99	4.91	3.83	15.73	1.70	2.25
Total forest sector	12.28	8.99	6.73	28.00	1.73	2.28
Ireland						
Forestry and logging	48.67	48.96	0.57	98.19	2.01	2.02
Solid wood products	229.11	84.77	59.05	372.92	1.37	1.63
Pulp and paper products	170.43	36.00	41.79	248.21	1.21	1.46
Wood furniture	5 372.05	513.42	1 107.13	6 992.60	1.10	1.30
Total forest sector	5 820.25	586.48	1 185.52	7 592.25	1.10	1.30
Latvia						
Forestry and logging	138.66	143.27	49.41	331.34	2.03	2.39

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Solid wood products	223.27	328.05	171.07	722.39	2.47	3.24
Pulp and paper products	20.06	16.93	12.63	49.63	1.84	2.47
Wood furniture	58.84	42.17	34.33	135.34	1.72	2.30
Total forest sector	440.84	385.02	232.43	1 058.29	1.87	2.40
Lithuania						
Forestry and logging	52.97	46.33	28.48	127.78	1.87	2.41
Solid wood products	222.50	104.30	100.47	427.27	1.47	1.92
Pulp and paper products	82.54	29.95	34.53	147.03	1.36	1.78
Wood furniture	361.90	159.93	157.27	679.10	1.44	1.88
Total forest sector	719.92	257.45	286.17	1 263.54	1.36	1.76
Norway						
Forestry and logging	105.27	192.68	80.52	378.47	2.83	3.60
Solid wood products	756.70	686.10	538.61	1 981.41	1.91	2.62
Pulp and paper products	324.27	369.82	263.63	957.72	2.14	2.95
Wood furniture	302.28	216.25	198.66	717.20	1.72	2.37
Total forest sector	1 488.52	1 259.48	996.88	3 744.87	1.85	2.52
Sweden						
Forestry and logging	2 069.48	1 634.80	953.32	4 657.60	1.79	2.25
Solid wood products	1 483.66	1 950.40	1 039.00	4 473.06	2.31	3.01
Pulp and paper products	2 337.97	3 339.27	1 770.68	7 447.92	2.43	3.19
Wood furniture	748.49	640.94	442.35	1 831.78	1.86	2.45
Total forest sector	6 639.61	5 896.95	3 703.20	16 239.76	1.89	2.45

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
United Kingdom of Great Britain and Northern Ireland						
Forestry and logging	321.92	444.75	263.88	1 030.55	2.38	3.20
Solid wood products	2 128.19	1 816.98	1 624.93	5 570.11	1.85	2.62
Pulp and paper products	2 358.89	1 800.44	1 699.25	5 858.58	1.76	2.48
Wood furniture	2 664.44	1 900.03	1 849.16	6 413.63	1.71	2.41
Total forest sector	7 473.45	5 445.57	5 164.17	18 083.19	1.73	2.42
Southern Europe	**13 773.19**	**12 536.20**	**7 601.98**	**33 911.36**	**1.80**	**2.30**
Croatia						
Forestry and logging	35.38	65.58	33.92	134.88	2.85	3.81
Solid wood products	205.25	176.45	134.33	516.03	1.86	2.51
Pulp and paper products	93.53	79.49	60.28	233.30	1.85	2.49
Wood furniture	112.14	89.29	69.72	271.15	1.80	2.42
Total forest sector	446.30	361.86	275.91	1 084.07	1.81	2.43
Greece						
Forestry and logging	7.76	9.75	-0.34	17.17	2.26	2.21
Solid wood products	33.70	58.97	23.92	116.59	2.75	3.46
Pulp and paper products	229.08	196.50	122.09	547.68	1.86	2.39
Wood furniture	61.83	52.60	32.60	147.03	1.85	2.38
Total forest sector	332.38	290.20	172.96	795.53	1.87	2.39
Italy						
Forestry and logging	420.12	320.71	163.03	903.86	1.76	2.15
Solid wood products	1 713.51	1 725.16	1 031.04	4 469.71	2.01	2.61

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Pulp and paper products	2 286.90	2 319.70	1 371.17	5 977.76	2.01	2.61
Wood furniture	2 962.32	3 003.75	1 753.87	7 719.94	2.01	2.61
Total forest sector	7 382.84	6 606.51	4 054.79	18 044.14	1.89	2.44
Malta						
Solid wood products	2.96	2.02	1.37	6.36	1.68	2.15
Wood furniture	19.83	5.10	6.83	31.75	1.26	1.60
Total forest sector	22.79	6.13	7.86	36.79	1.27	1.61
Portugal						
Forestry and logging	174.11	211.83	88.91	474.84	2.22	2.73
Solid wood products	474.63	394.88	262.09	1 131.60	1.83	2.38
Pulp and paper products	495.79	633.90	337.63	1 467.32	2.28	2.96
Wood furniture	432.09	289.36	219.12	940.57	1.67	2.18
Total forest sector	1 576.62	1 814.92	783.86	4 175.40	2.15	2.65
Slovenia						
Forestry and logging	29.59	61.14	10.83	101.56	3.07	3.43
Solid wood products	156.38	114.63	69.45	340.45	1.73	2.18
Pulp and paper products	140.21	123.87	68.93	333.01	1.88	2.38
Wood furniture	126.20	59.11	47.55	232.86	1.47	1.85
Total forest sector	452.38	324.07	186.61	963.05	1.72	2.13
Spain						
Forestry and logging	146.17	228.44	77.63	452.24	2.56	3.09
Solid wood products	930.51	931.61	602.28	2 464.39	2.00	2.65
Pulp and paper products	1 430.70	1 441.61	935.61	3 807.91	2.01	2.66
Wood furniture	1 052.50	875.97	620.61	2 549.08	1.83	2.42

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Total forest sector	3 559.87	3 132.51	2 120.00	8 812.38	1.88	2.48
Western Europe	**34 967.42**	**25 763.35**	**18 022.78**	**78 753.55**	**1.69**	**2.15**
Austria						
Forestry and logging	186.36	426.41	67.38	680.16	3.29	3.65
Solid wood products	1 432.53	1 421.04	745.09	3 598.67	1.99	2.51
Pulp and paper products	1 196.22	1 022.89	595.20	2 814.31	1.86	2.35
Wood furniture	760.63	604.74	368.57	1 733.94	1.80	2.28
Total forest sector	3 575.75	2 952.91	1 668.06	8 196.72	1.83	2.29
Belgium						
Forestry and logging	27.06	81.53	20.92	129.51	4.01	4.79
Solid wood products	580.21	576.18	287.22	1 443.61	1.99	2.49
Pulp and paper products	1 036.62	844.08	469.09	2 349.78	1.81	2.27
Wood furniture	648.62	403.22	266.18	1 318.02	1.62	2.03
Total forest sector	2 292.51	1 739.29	998.45	5 030.25	1.76	2.19
France						
Forestry and logging	422.73	728.97	313.09	1 464.79	2.72	3.47
Solid wood products	1 920.90	1 861.92	1 316.35	5 099.18	1.97	2.65
Pulp and paper products	2 580.80	2 466.89	1 773.81	6 821.49	1.96	2.64
Wood furniture	1 498.35	1 068.75	891.59	3 458.69	1.71	2.31
Total forest sector	6 422.78	5 345.62	3 992.31	15 760.71	1.83	2.45
Germany						
Forestry and logging	391.39	737.52	266.44	1 395.35	2.88	3.57
Solid wood products	4 200.04	3 992.14	2 463.99	10 656.17	1.95	2.54
Pulp and paper products	6 628.89	5 574.63	3 675.48	15 879.00	1.84	2.40

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Wood furniture	4 776.75	3 006.87	2 313.31	10 096.93	1.63	2.11
Total forest sector	15 997.06	11 948.69	8 175.73	36 121.49	1.75	2.26
Luxembourg						
Forestry and logging	2.44	2.02	0.02	4.48	1.82	1.83
Solid wood products	37.49	20.25	9.78	67.52	1.54	1.80
Wood furniture	4.44	1.77	1.12	7.33	1.40	1.65
Total forest sector	44.37	22.21	10.86	77.44	1.50	1.75
Netherlands						
Forestry and logging	28.56	45.77	18.19	92.52	2.60	3.24
Solid wood products	552.19	510.23	292.45	1 354.88	1.92	2.45
Pulp and paper products	1 528.13	1 192.17	744.65	3 464.95	1.78	2.27
Wood furniture	1 211.69	588.97	484.41	2 285.07	1.49	1.89
Total forest sector	3 320.57	2 177.32	1 475.51	6 973.40	1.66	2.10
Switzerland						
Forestry and logging	73.79	98.82	60.63	233.23	2.34	3.16
Solid wood products	2 007.26	939.22	1 046.05	3 992.53	1.47	1.99
Pulp and paper products	668.15	410.61	379.62	1 458.38	1.61	2.18
Wood furniture	565.16	362.81	324.03	1 252.00	1.64	2.22
Total forest sector	3 314.36	1 577.31	1 701.86	6 593.53	1.48	1.99
Oceania	**5 118.52**	**4 984.38**	**4 840.37**	**14 943.28**	**1.96**	**2.94**
Australia and New Zealand	**5 118.52**	**4 984.38**	**4 840.37**	**14 943.28**	**1.96**	**2.94**
Australia						
Forestry and logging	207.84	227.18	193.32	628.34	2.09	3.02
Solid wood products	1 627.24	1 959.37	2 491.24	6 077.85	2.20	3.74
Pulp and paper products	1 123.14	1 116.63	1 026.82	3 266.58	1.99	2.91

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
---------- 2015 constant, USD million ----------						
Wood furniture	742.25	817.86	716.38	2 276.48	2.10	3.07
Total forest sector	3 700.46	3 667.02	3 338.60	10 706.08	1.99	2.89
New Zealand						
Forestry and logging	316.38	469.30	443.87	1 229.54	2.48	3.89
Solid wood products	550.53	641.75	668.23	1 860.50	2.17	3.38
Pulp and paper products	390.17	412.70	446.61	1 249.48	2.06	3.20
Wood furniture	160.98	169.72	183.00	513.71	2.05	3.19
Total forest sector	1 418.06	1 317.37	1 501.77	4 237.19	1.93	2.99
Grand Total	**180 988.70**	**155 032.68**	**102 515.01**	**438 536.39**	**1.72**	**2.26**

Sources: Author calculations based on UNIDO. 2021. *International Yearbook of Industrial Statistics 2021*. USA: Northampton, MA. Edward Elgar Publishing, Inc.; ILO. 2021. *ILOSTAT: employment by sex and economic activity*. https://ilostat.ilo.org/data/. Cited 10 October 2021; UNSD. 2021. *Employed population by status in employment, industry and sex*. http://data.un.org. Cited 10 October 2021.

Note: Direct effects measure existing activities in the forest subsectors. Total effects = direct effects + indirect effects + induced effects. The direct effects across subsectors are additive but the total effects are not additive. For example, a portion of the indirect effects for the solid wood products manufacturing subsector is already included in the direct effects for the forestry and logging subsector. Summing the individual subsector indirect and induced impacts would result in double counting.

For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. Regional and subregional multipliers are simple averages across the study countries in the region or subregion.

Annex 5. Predicted multipliers and estimated economic contribution of value added in the forest sector in the selected countries lacking IMPLAN data, 2015

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Africa						
Northern Africa						
Algeria						
Forestry and logging					1.49	1.93
Solid wood products					1.92	2.67
Pulp and paper products					1.87	2.60
Furniture					1.58	2.21
Egypt						
Forestry and logging					1.49	1.79
Solid wood products	19.15	17.40	9.77	46.32	1.91	2.42
Pulp and paper products	382.59	329.09	189.68	901.37	1.86	2.36
Furniture	49.56	28.23	22.67	100.47	1.57	2.03
Libya						
Forestry and logging					1.44	1.92
Solid wood products					1.82	2.66
Pulp and paper products					1.77	2.58
Furniture					1.51	2.20

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
South Sudan						
Forestry and logging					1.50	2.85
Solid wood products					1.94	4.31
Pulp and paper products					1.89	4.16
Furniture					1.59	3.40
Sudan						
Forestry and logging	190.20	80.88	54.73	325.81	1.43	1.71
Solid wood products					1.79	2.28
Pulp and paper products					1.75	2.22
Furniture					1.50	1.92
Sub-Saharan Africa						
Angola						
Forestry and logging					1.66	3.73
Solid wood products					2.24	5.90
Pulp and paper products					2.17	5.68
Furniture					1.78	4.55
Benin						
Forestry and logging	166.35	90.48	292.28	549.11	1.54	3.30
Solid wood products					2.02	5.12
Pulp and paper products					1.96	4.94
Furniture					1.64	3.98
Botswana						
Forestry and logging	57.44	32.28	116.07	205.79	1.56	3.58
Solid wood products					2.05	5.63
Pulp and paper products					1.99	5.42
Furniture					1.66	4.35
Burkina Faso						
Forestry and logging	364.11	191.15	561.19	1 116.45	1.52	3.07

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Solid wood products					1.98	4.70
Pulp and paper products					1.93	4.54
Furniture					1.62	3.68
Burundi						
Forestry and logging	22.78	10.30	28.80	61.88	1.45	2.72
Solid wood products	2.47	2.08	5.50	10.05	1.85	4.08
Pulp and paper products	0.43	0.34	0.92	1.70	1.80	3.94
Furniture					1.53	3.23
Cabo Verde						
Forestry and logging	6.05	3.13	4.36	13.54	1.52	2.24
Solid wood products	3.75	3.63	4.71	12.09	1.97	3.22
Pulp and paper products	4.32	3.96	5.21	13.49	1.92	3.12
Furniture					1.61	2.61
Cameroon						
Forestry and logging	821.36	318.03	58.58	1 197.97	1.39	1.46
Solid wood products	94.47	65.54	15.42	175.43	1.69	1.86
Pulp and paper products	66.80	44.30	9.90	121.01	1.66	1.81
Furniture	15.00	7.53	0.53	23.06	1.50	1.54
Central African Republic						
Forestry and logging	29.60	13.79	47.70	91.09	1.47	3.08
Solid wood products					1.87	4.72
Pulp and paper products					1.82	4.56
Furniture					1.55	3.69
Chad						
Forestry and logging					1.51	2.93
Solid wood products					1.95	4.46
Pulp and paper products					1.90	4.31
Furniture					1.60	3.50

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Congo						
Forestry and logging	110.03	62.63	227.22	399.89	1.57	3.63
Solid wood products	70.05	74.51	256.08	400.65	2.06	5.72
Pulp and paper products	10.01	10.08	35.07	55.15	2.01	5.51
Furniture					1.67	4.42
Côte d'Ivoire						
Forestry and logging	82.87	45.82	93.99	222.69	1.55	2.69
Solid wood products					2.03	4.02
Pulp and paper products					1.98	3.89
Furniture					1.65	3.19
Democratic Republic of the Congo						
Forestry and logging	25.49	16.65	65.24	107.38	1.65	4.21
Solid wood products					2.22	6.76
Pulp and paper products					2.16	6.50
Furniture					1.77	5.17
Equatorial Guinea						
Forestry and logging	35.13	19.25	71.48	125.86	1.55	3.58
Solid wood products					2.02	5.63
Pulp and paper products					1.97	5.42
Furniture					1.64	4.35
Eswatini						
Forestry and logging	6.18	2.86	8.37	17.41	1.46	2.82
Solid wood products	9.13	7.90	21.80	38.83	1.87	4.25
Pulp and paper products	1.67	1.37	3.83	6.86	1.82	4.11
Furniture	13.57	7.36	24.60	45.53	1.54	3.36
Ethiopia						
Forestry and logging	3 695.21	2 419.21	8 599.84	14 714.26	1.65	3.98

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Solid wood products	4.89	5.98	20.12	30.99	2.22	6.34
Pulp and paper products	13.43	15.56	53.05	82.05	2.16	6.11
Furniture	46.41	35.61	143.92	225.94	1.77	4.87
Gabon						
Forestry and logging	105.54	62.83	260.71	429.08	1.60	4.07
Solid wood products					2.11	6.49
Pulp and paper products					2.05	6.25
Furniture					1.70	4.98
Gambia						
Forestry and logging	3.61	1.74	6.85	12.20	1.48	3.38
Solid wood products					1.90	5.26
Pulp and paper products					1.85	5.07
Furniture					1.56	4.08
Ghana						
Forestry and logging	797.31	515.49	1 857.29	3 170.09	1.65	3.98
Solid wood products	289.74	350.08	1 194.78	1 834.60	2.21	6.33
Pulp and paper products	107.16	122.59	423.55	653.30	2.14	6.10
Furniture	115.49	87.50	358.32	561.31	1.76	4.86
Guinea						
Forestry and logging	245.67	128.50	401.91	776.08	1.52	3.16
Solid wood products					1.98	4.87
Pulp and paper products					1.93	4.70
Furniture					1.61	3.80
Guinea-Bissau						
Forestry and logging	18.30	8.26	29.86	56.42	1.45	3.08
Solid wood products					1.84	4.73
Pulp and paper products					1.80	4.57
Furniture					1.53	3.70

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Kenya						
Forestry and logging	260.81	155.81	423.82	840.44	1.60	3.22
Solid wood products	85.53	95.49	245.07	426.09	2.12	4.98
Pulp and paper products	99.68	105.37	274.02	479.07	2.06	4.81
Furniture	241.87	169.34	527.94	939.15	1.70	3.88
Lesotho						
Forestry and logging	20.05	9.17	28.38	57.60	1.46	2.87
Solid wood products					1.85	4.35
Pulp and paper products					1.81	4.21
Furniture					1.54	3.43
Liberia						
Forestry and logging	187.35	94.33	341.55	623.24	1.50	3.33
Solid wood products					1.94	5.17
Pulp and paper products					1.89	4.98
Furniture					1.59	4.02
Madagascar						
Forestry and logging	502.60	268.74	830.68	1 602.02	1.53	3.19
Solid wood products	21.02	21.00	61.37	103.39	2.00	4.92
Pulp and paper products	7.51	7.10	21.02	35.63	1.95	4.75
Furniture					1.63	3.84
Malawi						
Forestry and logging	186.35	89.91	247.10	523.35	1.48	2.81
Solid wood products	7.96	7.18	18.61	33.74	1.90	4.24
Pulp and paper products	3.18	2.72	7.14	13.04	1.85	4.10
Furniture	11.14	6.30	19.84	37.28	1.57	3.35
Mali						
Forestry and logging	257.19	139.29	428.26	824.73	1.54	3.21
Solid wood products					2.01	4.95

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products					1.96	4.78
Furniture					1.63	3.86
Mauritius						
Forestry and logging	87.43	44.23	135.42	267.09	1.51	3.05
Solid wood products	2.77	2.62	7.57	12.95	1.95	4.68
Pulp and paper products	14.66	13.13	38.47	66.26	1.90	4.52
Furniture	10.18	6.04	21.11	37.33	1.59	3.67
Mozambique						
Forestry and logging	271.31	149.16	456.40	876.87	1.55	3.23
Solid wood products					2.03	5.00
Pulp and paper products					1.97	4.82
Furniture					1.64	3.90
Namibia						
Forestry and logging					1.53	3.22
Solid wood products					1.99	4.98
Pulp and paper products					1.94	4.80
Furniture					1.62	3.88
Niger						
Forestry and logging	136.90	68.43	186.12	391.45	1.50	2.86
Solid wood products					1.93	4.33
Pulp and paper products					1.88	4.18
Furniture					1.59	3.41
Nigeria						
Forestry and logging	976.67	757.38	2 511.43	4 245.48	1.78	4.35
Solid wood products					2.45	7.00
Pulp and paper products					2.37	6.73
Furniture					1.91	5.34
Rwanda						
Forestry and logging	314.85	154.95	418.36	888.16	1.49	2.82

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Solid wood products	22.19	20.41	51.99	94.59	1.92	4.26
Pulp and paper products					1.87	4.12
Furniture	36.06	20.80	64.38	121.24	1.58	3.36
Senegal						
Forestry and logging	109.82	61.63	193.27	364.71	1.56	3.32
Solid wood products	5.24	5.49	16.29	27.03	2.05	5.16
Pulp and paper products	13.62	13.53	40.62	67.77	1.99	4.98
Furniture					1.66	4.01
Sierra Leone						
Forestry and logging	350.86	175.39	582.00	1 108.25	1.50	3.16
Solid wood products					1.93	4.87
Pulp and paper products					1.88	4.70
Furniture					1.59	3.80
Somalia						
Forestry and logging					1.51	3.28
Solid wood products					1.95	5.08
Pulp and paper products					1.90	4.90
Furniture					1.60	3.95
Togo						
Forestry and logging	67.64	33.67	110.71	212.02	1.50	3.13
Solid wood products					1.93	4.82
Pulp and paper products					1.88	4.66
Furniture					1.58	3.77
Uganda						
Forestry and logging	582.13	336.50	1 005.05	1 923.68	1.58	3.30
Solid wood products					2.08	5.13
Pulp and paper products					2.02	4.95
Furniture					1.68	3.99

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
United Republic of Tanzania						
Forestry and logging	1 612.39	960.15	2 770.13	5 342.66	1.60	3.31
Solid wood products	42.76	47.58	129.64	219.98	2.11	5.15
Pulp and paper products	10.18	10.73	29.61	50.52	2.05	4.96
Furniture	13.15	9.18	30.29	52.61	1.70	4.00
Zambia						
Forestry and logging	0.26	0.15	0.45	0.86	1.57	3.30
Solid wood products	28.79	30.41	88.32	147.51	2.06	5.12
Pulp and paper products	28.47	28.48	83.78	140.73	2.00	4.94
Furniture					1.66	3.99
Zimbabwe						
Forestry and logging					1.55	3.12
Solid wood products	2.41	2.46	6.69	11.57	2.02	4.80
Pulp and paper products	0.62	0.60	1.66	2.88	1.97	4.63
Furniture	11.05	7.08	23.29	41.42	1.64	3.75
Americas						
Latin America and the Caribbean						
Bahamas						
Forestry and logging					1.42	2.45
Solid wood products					1.78	3.60
Pulp and paper products					1.74	3.49
Furniture					1.49	2.89
Barbados						
Forestry and logging					1.37	2.03
Solid wood products					1.69	2.85
Pulp and paper products					1.66	2.77
Furniture					1.43	2.34

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Belize						
Forestry and logging	6.16	2.38	5.08	13.61	1.39	2.21
Solid wood products					1.72	3.17
Pulp and paper products					1.68	3.07
Furniture					1.45	2.57
Bolivia (Plurinational State of)						
Forestry and logging	275.68	143.17	296.59	715.44	1.52	2.60
Solid wood products	28.05	27.23	52.95	108.23	1.97	3.86
Pulp and paper products	113.84	104.61	206.39	424.84	1.92	3.73
Furniture	15.97	9.72	23.33	49.02	1.61	3.07
Cuba						
Forestry and logging					1.61	3.48
Solid wood products					2.14	5.45
Pulp and paper products					2.08	5.25
Furniture					1.71	4.22
Dominican Republic						
Forestry and logging	4.39	2.42	5.07	11.88	1.55	2.70
Solid wood products					2.03	4.05
Pulp and paper products					1.97	3.92
Furniture					1.64	3.21
Ecuador						
Forestry and logging	1 255.80	686.84	1 287.60	3 230.24	1.55	2.57
Solid wood products	117.91	120.52	211.62	450.05	2.02	3.82
Pulp and paper products	330.36	319.72	569.83	1 219.92	1.97	3.69
Furniture	112.79	72.29	157.74	342.83	1.64	3.04
El Salvador						
Forestry and logging	166.01	84.19	181.71	431.92	1.51	2.60
Solid wood products					1.95	3.87

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products					1.90	3.74
Furniture					1.59	3.08
Guatemala						
Forestry and logging	257.59	135.12	249.59	642.30	1.52	2.49
Solid wood products					1.98	3.68
Pulp and paper products					1.93	3.56
Furniture					1.61	2.94
Guyana						
Forestry and logging	100.92	39.41	68.17	208.50	1.39	2.07
Solid wood products					1.73	2.91
Pulp and paper products					1.69	2.83
Furniture					1.46	2.38
Haiti						
Forestry and logging	127.97	60.52	117.04	305.52	1.47	2.39
Solid wood products					1.88	3.49
Pulp and paper products					1.84	3.38
Furniture					1.55	2.80
Honduras						
Forestry and logging	101.02	49.48	98.02	248.52	1.49	2.46
Solid wood products	32.88	30.10	55.92	118.90	1.92	3.62
Pulp and paper products					1.87	3.50
Furniture	33.57	19.27	44.31	97.15	1.57	2.89
Jamaica						
Forestry and logging	7.57	3.50	6.90	17.97	1.46	2.37
Solid wood products					1.87	3.46
Pulp and paper products					1.82	3.35
Furniture					1.54	2.78
Nicaragua						
Forestry and logging	121.13	57.56	119.39	298.09	1.48	2.46

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Solid wood products	33.70	29.93	58.28	121.91	1.89	3.62
Pulp and paper products					1.84	3.50
Furniture	4.29	2.39	5.74	12.42	1.56	2.89
Panama						
Forestry and logging	111.83	55.84	110.02	277.69	1.50	2.48
Solid wood products	6.90	6.44	11.90	25.24	1.93	3.66
Pulp and paper products	37.20	32.87	61.62	131.69	1.88	3.54
Furniture	31.70	18.55	42.44	92.69	1.59	2.92
Paraguay						
Forestry and logging	370.94	188.81	379.47	939.22	1.51	2.53
Solid wood products	141.33	134.44	253.48	529.24	1.95	3.74
Pulp and paper products	116.33	104.77	200.43	421.53	1.90	3.62
Furniture	132.32	78.93	184.03	395.28	1.60	2.99
Saint Vincent and the Grenadines						
Forestry and logging	0.34	0.12	0.29	0.75	1.36	2.22
Solid wood products					1.68	3.19
Pulp and paper products					1.65	3.10
Furniture					1.43	2.59
Suriname						
Forestry and logging					1.43	2.43
Solid wood products					1.81	3.56
Pulp and paper products					1.76	3.45
Furniture					1.51	2.85
Trinidad and Tobago						
Forestry and logging	14.58	6.43	12.08	33.09	1.44	2.27
Solid wood products	0.00	0.00	0.00	0.00	1.82	3.27
Pulp and paper products	48.24	37.63	67.23	153.09	1.78	3.17

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Furniture	6.65	3.44	7.52	17.61	1.52	2.65
Uruguay						
Forestry and logging	265.32	143.65	367.69	776.67	1.54	2.93
Solid wood products	81.46	82.43	198.87	362.76	2.01	4.45
Pulp and paper products	270.12	258.79	632.80	1 161.72	1.96	4.30
Furniture	31.42	19.93	58.60	109.95	1.63	3.50
Venezuela (Bolivarian Republic of)						
Forestry and logging					1.62	2.86
Solid wood products					2.15	4.33
Pulp and paper products					2.09	4.18
Furniture					1.72	3.41
Asia						
Central Asia						
Kyrgyzstan						
Forestry and logging	2.40	0.76	0.37	3.53	1.32	1.47
Solid wood products	2.66	1.58	0.67	4.91	1.59	1.85
Pulp and paper products	3.48	1.96	0.86	6.30	1.56	1.81
Furniture	4.09	1.52	0.98	6.59	1.37	1.61
Tajikistan						
Forestry and logging	1.91	0.60	0.24	2.76	1.32	1.44
Solid wood products	2.95	1.74	0.60	5.30	1.59	1.79
Pulp and paper products					1.56	1.76
Furniture					1.37	1.57
Turkmenistan						
Forestry and logging					1.36	1.53
Solid wood products					1.68	1.96
Pulp and paper products					1.64	1.91
Furniture					1.42	1.69

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Uzbekistan						
Forestry and logging					1.39	1.56
Solid wood products	129.67	95.56	34.35	259.58	1.74	2.00
Pulp and paper products	81.39	56.78	21.15	159.32	1.70	1.96
Furniture	111.76	51.64	29.42	192.82	1.46	1.73
Eastern Asia						
Mongolia						
Forestry and logging	26.49	16.41	27.73	70.64	1.62	2.67
Solid wood products	16.93	19.61	30.94	67.48	2.16	3.98
Pulp and paper products	7.84	8.59	13.77	30.20	2.10	3.85
Furniture	10.32	7.49	14.81	32.62	1.73	3.16
South-eastern Asia						
Lao People's Democratic Republic						
Forestry and logging	101.38	57.48	50.89	209.75	1.57	2.07
Solid wood products	54.29	57.54	46.46	158.29	2.06	2.92
Pulp and paper products	20.87	20.94	17.27	59.08	2.00	2.83
Furniture	107.97	71.75	77.98	257.69	1.66	2.39
Myanmar						
Forestry and logging	102.84	67.39	60.91	231.15	1.66	2.25
Solid wood products	3.34	4.09	3.38	10.81	2.22	3.24
Pulp and paper products					2.16	3.14
Furniture	0.09	0.07	0.07	0.23	1.77	2.62
Southern Asia						
Afghanistan						
Forestry and logging					1.34	1.45
Solid wood products					1.63	1.81
Pulp and paper products					1.60	1.77
Furniture					1.39	1.59

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Bangladesh						
Forestry and logging	2 629.25	1 100.29	381.67	4 111.22	1.42	1.56
Solid wood products	72.82	56.95	16.59	146.36	1.78	2.01
Pulp and paper products	331.17	245.24	74.45	650.86	1.74	1.97
Furniture	37.87	18.57	9.12	65.56	1.49	1.73
Bhutan						
Forestry and logging	53.49	15.64	9.73	78.86	1.29	1.47
Solid wood products					1.55	1.85
Pulp and paper products					1.52	1.81
Furniture					1.34	1.62
Iran (Islamic Republic of)						
Forestry and logging	182.23	84.53	40.53	307.28	1.46	1.69
Solid wood products	306.64	265.81	111.20	683.65	1.87	2.23
Pulp and paper products	710.27	582.98	251.78	1 545.03	1.82	2.18
Furniture	326.53	177.50	113.17	617.19	1.54	1.89
Nepal						
Forestry and logging	35.72	12.11	3.95	51.78	1.34	1.45
Solid wood products	23.00	14.58	3.95	41.53	1.63	1.81
Pulp and paper products	12.00	7.20	2.04	21.24	1.60	1.77
Furniture	15.00	5.96	2.79	23.75	1.40	1.58
Pakistan						
Forestry and logging	1 774.66	769.20	276.09	2 819.94	1.43	1.59
Solid wood products	52.62	42.62	12.90	108.14	1.81	2.06
Pulp and paper products	278.48	213.59	67.33	559.41	1.77	2.01
Furniture	71.46	36.30	18.30	126.05	1.51	1.76
Sri Lanka						
Forestry and logging	556.06	199.79	44.44	800.30	1.36	1.44
Solid wood products	30.75	20.64	3.55	54.94	1.67	1.79

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products	106.70	67.84	12.42	186.96	1.64	1.75
Furniture	32.95	13.88	4.90	51.73	1.42	1.57
Western Asia						
Armenia						
Forestry and logging	6.15	2.72	3.36	12.23	1.44	1.99
Solid wood products	1.24	1.02	1.17	3.43	1.83	2.77
Pulp and paper products	14.71	11.50	13.42	39.63	1.78	2.69
Furniture	4.09	2.12	3.13	9.33	1.52	2.28
Azerbaijan						
Forestry and logging	0.77	0.37	0.36	1.50	1.48	1.95
Solid wood products	4.76	4.26	3.82	12.83	1.90	2.70
Pulp and paper products	67.24	57.00	52.14	176.37	1.85	2.62
Furniture	12.47	7.00	8.33	27.80	1.56	2.23
Bahrain						
Forestry and logging					1.45	2.10
Solid wood products	8.09	6.86	9.16	24.11	1.85	2.98
Pulp and paper products	101.07	81.17	110.09	292.34	1.80	2.89
Furniture	115.32	61.34	103.95	280.61	1.53	2.43
Georgia						
Forestry and logging	38.94	17.30	19.62	75.86	1.44	1.95
Solid wood products	17.05	14.16	14.81	46.02	1.83	2.70
Pulp and paper products	12.25	9.63	10.26	32.14	1.79	2.62
Furniture	15.78	8.22	11.19	35.18	1.52	2.23
Iraq						
Forestry and logging					1.55	2.10
Solid wood products	2.96	3.02	2.82	8.79	2.02	2.98
Pulp and paper products	0.11	0.10	0.10	0.31	1.97	2.89
Furniture	131.14	83.92	103.60	318.66	1.64	2.43
Jordan						

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Forestry and logging					1.52	2.25
Solid wood products					1.97	3.25
Pulp and paper products					1.92	3.15
Furniture					1.61	2.63
Kuwait						
Forestry and logging					1.49	2.19
Solid wood products	24.93	22.90	30.31	78.14	1.92	3.13
Pulp and paper products	86.09	74.87	100.78	261.74	1.87	3.04
Furniture	111.68	64.33	108.27	284.28	1.58	2.55
Lebanon						
Forestry and logging					1.52	2.21
Solid wood products					1.96	3.17
Pulp and paper products					1.91	3.08
Furniture					1.60	2.57
Oman						
Forestry and logging					1.49	2.10
Solid wood products	170.47	156.44	180.43	507.33	1.92	2.98
Pulp and paper products	26.86	23.34	27.40	77.59	1.87	2.89
Furniture	60.80	34.99	52.00	147.79	1.58	2.43
Qatar						
Forestry and logging					1.41	1.98
Solid wood products	137.83	104.62	137.05	379.50	1.76	2.75
Pulp and paper products	11.70	8.41	11.20	31.32	1.72	2.68
Furniture	115.22	54.84	91.43	261.49	1.48	2.27
United Arab Emirates						
Forestry and logging					1.49	2.04
Solid wood products	512.46	464.55	489.01	1 466.02	1.91	2.86
Pulp and paper products	320.22	274.85	294.72	889.78	1.86	2.78

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Furniture	863.99	491.14	672.83	2 027.96	1.57	2.35
Yemen						
Forestry and logging					1.46	1.82
Solid wood products					1.85	2.48
Pulp and paper products					1.81	2.41
Furniture					1.54	2.07
Europe						
Eastern Europe						
Belarus						
Forestry and logging	2 598.99	1 813.49	1 690.84	6 103.32	1.70	2.35
Solid wood products	486.22	634.04	540.55	1 660.81	2.30	3.42
Pulp and paper products	132.45	163.54	142.32	438.31	2.23	3.31
Furniture	250.28	204.66	233.09	688.03	1.82	2.75
Republic of Moldova						
Forestry and logging					1.55	1.93
Solid wood products	3.54	3.62	2.26	9.43	2.02	2.66
Pulp and paper products	6.20	5.99	3.83	16.02	1.97	2.59
Furniture	15.37	9.85	8.62	33.84	1.64	2.20
Ukraine						
Forestry and logging	160.18	115.86	92.90	368.93	1.72	2.30
Solid wood products	280.98	379.83	276.29	937.10	2.35	3.34
Pulp and paper products	368.92	472.19	351.27	1 192.38	2.28	3.23
Furniture	163.01	138.18	137.41	438.61	1.85	2.69
Southern Europe						
Albania						
Forestry and logging					1.60	2.08
Solid wood products	6.53	7.29	5.30	19.11	2.12	2.93
Pulp and paper products	13.00	13.75	10.23	36.98	2.06	2.84
Furniture	18.06	12.65	12.58	43.28	1.70	2.40
Andorra						

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Forestry and logging	0.68	0.33	0.47	1.48	1.49	2.17
Solid wood products					1.91	3.10
Pulp and paper products					1.87	3.01
Furniture					1.57	2.52
Bosnia and Herzegovina						
Forestry and logging	125.32	74.56	51.84	251.73	1.59	2.01
Solid wood products	133.46	148.40	92.79	374.65	2.11	2.81
Pulp and paper products	61.95	65.22	41.79	168.96	2.05	2.73
Furniture	83.38	58.14	50.96	192.48	1.70	2.31
Montenegro						
Forestry and logging	2.45	1.37	1.34	5.16	1.56	2.10
Solid wood products	107.93	112.52	100.91	321.36	2.04	2.98
Pulp and paper products	29.24	28.86	26.41	84.50	1.99	2.89
Furniture	38.04	24.87	29.59	92.49	1.65	2.43
North Macedonia						
Forestry and logging	40.92	24.08	19.52	84.52	1.59	2.07
Solid wood products	13.38	14.71	10.82	38.91	2.10	2.91
Pulp and paper products	13.81	14.38	10.82	39.01	2.04	2.82
Furniture	28.56	19.69	19.77	68.02	1.69	2.38
Serbia						
Forestry and logging	138.23	89.82	64.00	292.05	1.65	2.11
Solid wood products	142.03	172.47	110.69	425.19	2.21	2.99
Pulp and paper products	165.19	189.94	124.89	480.02	2.15	2.91
Furniture	123.30	93.89	84.09	301.27	1.76	2.44
Western Europe						
Liechtenstein						
Forestry and logging					1.19	1.39
Solid wood products					1.36	1.70

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- 2015 constant, USD million ----------					
Pulp and paper products					1.34	1.67
Furniture					1.22	1.51
Oceania						
Melanesia						
Fiji						
Forestry and logging	20.31	6.46	4.33	31.10	1.32	1.53
Solid wood products	25.84	15.36	9.23	50.43	1.59	1.95
Pulp and paper products	15.81	8.90	5.49	30.20	1.56	1.91
Furniture	10.00	3.73	3.16	16.90	1.37	1.69
Papua New Guinea						
Forestry and logging	313.67	102.19	28.93	444.79	1.33	1.42
Solid wood products					1.61	1.75
Pulp and paper products					1.58	1.72
Furniture					1.38	1.54
Solomon Islands						
Forestry and logging	74.80	20.26	10.38	105.44	1.27	1.41
Solid wood products					1.51	1.73
Pulp and paper products					1.48	1.70
Furniture					1.32	1.53
Vanuatu						
Forestry and logging	8.05	2.09	1.19	11.32	1.26	1.41
Solid wood products					1.49	1.73
Pulp and paper products					1.46	1.70
Furniture					1.30	1.53

Source: Author calculations based on IMPLAN. 2021. *International IMPLAN data (model year 2015) and modeling software*. Huntersville, NC.

Note: Direct effects measure existing activities in the forest subsectors. Total effects = direct effects + indirect effects + induced effects. For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. Estimates below USD 1 million are suppressed.

Annex 6. Predicted multipliers and estimated economic contribution of employment in the forest sector in the selected countries lacking IMPLAN data, 2015

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Africa						
Northern Africa						
Algeria						
Forestry and logging					1.25	1.47
Solid wood products	11	8	6	24	1.72	2.22
Pulp and paper products	2	1	1	4	1.78	2.52
Wood furniture	5	2	3	10	1.44	1.98
Egypt						
Forestry and logging	12	3	1	16	1.24	1.35
Solid wood products	2	1	0	4	1.70	1.92
Pulp and paper products	23	17	9	49	1.76	2.14
Wood furniture	10	4	3	17	1.42	1.74
Libya						
Forestry and logging					1.23	1.51
Solid wood products	1	1	1	3	1.66	2.32
Pulp and paper products					1.71	2.65
Wood furniture					1.40	2.07
South Sudan						
Forestry and logging					1.38	2.19
Solid wood products					2.08	4.10
Pulp and paper products					2.18	4.85
Wood furniture					1.66	3.49

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Sudan						
Forestry and logging					1.22	1.33
Solid wood products					1.62	1.85
Pulp and paper products					1.68	2.05
Wood furniture					1.38	1.68
Sub-Saharan Africa						
Angola						
Forestry and logging	1	0	1	3	1.49	2.91
Solid wood products					2.39	5.96
Pulp and paper products	1	1	3	4	2.51	7.17
Wood furniture	2	2	7	11	1.84	4.99
Benin						
Forestry and logging	2	1	2	4	1.41	2.63
Solid wood products					2.17	5.23
Pulp and paper products					2.27	6.26
Wood furniture					1.71	4.40
Botswana						
Forestry and logging					1.43	2.96
Solid wood products	2	2	6	9	2.21	6.09
Pulp and paper products					2.32	7.33
Wood furniture	2	1	6	9	1.74	5.10
Burkina Faso						
Forestry and logging	2	1	2	4	1.39	2.37
Solid wood products	15	16	36	67	2.12	4.55
Pulp and paper products					2.22	5.42
Wood furniture					1.68	3.86
Burundi						
Forestry and logging	1		1	2	1.35	2.13
Solid wood products					1.99	3.93
Pulp and paper products					2.07	4.65
Wood furniture					1.60	3.36
Cabo Verde						
Forestry and logging					1.29	1.86
Solid wood products					1.82	3.24
Pulp and paper products					1.90	3.79
Wood furniture					1.50	2.81
Cameroon						
Forestry and logging	18	5	0	23	1.28	1.30
Solid wood products	9	7	1	17	1.73	1.87

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Pulp and paper products	2	2	0	5	1.91	1.94
Wood furniture	4	2	0	7	1.53	1.59
Central African Republic						
Forestry and logging	3	1	4	9	1.36	2.54
Solid wood products	1	1	3	5	2.03	4.99
Pulp and paper products					2.12	5.97
Wood furniture					1.63	4.21
Chad						
Forestry and logging					1.38	2.26
Solid wood products					2.10	4.28
Pulp and paper products					2.19	5.08
Wood furniture					1.67	3.64
Congo						
Forestry and logging	7	3	10	20	1.43	3.00
Solid wood products	4	5	17	26	2.23	6.18
Pulp and paper products					2.34	7.45
Wood furniture					1.75	5.17
Côte d'Ivoire						
Forestry and logging	34	13	27	73	1.38	2.16
Solid wood products	14	15	27	56	2.08	4.02
Pulp and paper products					2.17	4.76
Wood furniture					1.66	3.43
Democratic Republic of the Congo						
Forestry and logging					1.47	3.07
Solid wood products	1	2	6	9	2.34	6.38
Pulp and paper products				2.46	7.69	
Wood furniture					1.82	5.33
Equatorial Guinea						
Forestry and logging					1.42	2.99
Solid wood products					2.18	6.17
Pulp and paper products					2.29	7.43
Wood furniture					1.72	5.16
Eswatini						
Forestry and logging	5	2	5	12	1.35	2.23
Solid wood products	2	2	5	10	2.01	4.21
Pulp and paper products	2	2	5	8	2.10	4.99

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Wood furniture	1	0	1	2	1.61	3.58
Ethiopia						
Forestry and logging	2	1	3	6	1.46	2.72
Solid wood products	7	9	22	37	2.32	5.48
Pulp and paper products	4	6	17	27	2.44	6.57
Wood furniture	13	10	35	58	1.80	4.60
Gabon						
Forestry and logging	9	4	19	32	1.45	3.50
Solid wood products	7	10	38	55	2.29	7.48
Pulp and paper products					2.40	9.06
Wood furniture					1.78	6.22
Gambia						
Forestry and logging	2	1	3	5	1.38	2.89
Solid wood products					2.07	5.91
Pulp and paper products					2.16	7.11
Wood furniture					1.65	4.95
Ghana						
Forestry and logging	17	8	27	52	1.47	3.02
Solid wood products	27	37	106	170	2.35	6.26
Pulp and paper products	4	6	22	33	2.46	7.55
Wood furniture	15	12	51	79	1.82	5.23
Guinea						
Forestry and logging	9	4	10	23	1.40	2.48
Solid wood products					2.13	4.85
Pulp and paper products					2.23	5.79
Wood furniture					1.68	4.10
Guinea-Bissau						
Forestry and logging					1.35	2.57
Solid wood products					2.00	5.09
Pulp and paper products					2.09	6.09
Wood furniture					1.61	4.29
Kenya						
Forestry and logging					1.44	2.37
Solid wood products	10	13	24	47	2.24	4.57
Pulp and paper products	10	13	30	53	2.35	5.44
Wood furniture	7	5	15	28	1.76	3.87
Lesotho						
Forestry and logging					1.35	2.31

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Solid wood products					2.01	4.40
Pulp and paper products					2.09	5.24
Wood furniture					1.61	3.74
Liberia						
Forestry and logging	2	1	3	6	1.39	2.74
Solid wood products					2.10	5.51
Pulp and paper products					2.20	6.61
Wood furniture					1.67	4.63
Madagascar						
Forestry and logging	2	1	2	5	1.40	2.49
Solid wood products	68	79	186	333	2.15	4.86
Pulp and paper products	1	1	3	4	2.25	5.81
Wood furniture	40	28	96	164	1.70	4.11
Malawi						
Forestry and logging	1	0	1	2	1.37	2.18
Solid wood products	2	2	4	7	2.04	4.06
Pulp and paper products					2.14	4.81
Wood furniture	2	1	4	7	1.63	3.47
Mali						
Forestry and logging	1	0	1	3	1.41	2.52
Solid wood products					2.16	4.96
Pulp and paper products					2.27	5.93
Wood furniture					1.71	4.19
Mauritius						
Forestry and logging					1.38	2.44
Solid wood products					2.09	4.73
Pulp and paper products					2.19	5.65
Wood furniture					1.66	4.01
Mozambique						
Forestry and logging	25	10	27	63	1.41	2.49
Solid wood products	5	6	14	25	2.17	4.88
Pulp and paper products					2.27	5.83
Wood furniture					1.71	4.12
Namibia						
Forestry and logging					1.40	2.58
Solid wood products					2.14	5.11
Pulp and paper products					2.24	6.12
Wood furniture					1.69	4.31

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Niger						
Forestry and logging	1	0	1	2	1.38	2.19
Solid wood products	1	1	3	5	2.07	4.10
Pulp and paper products					2.17	4.86
Wood furniture	5	3	10	18	1.65	3.49
Nigeria						
Forestry and logging	32	18	48	98	1.54	3.04
Solid wood products	3	4	11	18	2.55	6.29
Pulp and paper products	12	19	57	88	2.68	7.58
Wood furniture	195	184	648	1 026	1.94	5.26
Rwanda						
Forestry and logging	2	1	1	3	1.37	2.18
Solid wood products	1	1	3	5	2.06	4.06
Pulp and paper products					2.15	4.81
Wood furniture	4	2	7	13	1.64	3.47
Senegal						
Forestry and logging	14	6	16	36	1.42	2.62
Solid wood products					2.20	5.21
Pulp and paper products					2.31	6.24
Wood furniture					1.73	4.39
Sierra Leone						
Forestry and logging					1.38	2.55
Solid wood products					2.09	5.03
Pulp and paper products					2.19	6.01
Wood furniture	3	2	8	13	1.66	4.24
Somalia						
Forestry and logging					1.39	2.64
Solid wood products					2.11	5.27
Pulp and paper products					2.20	6.31
Wood furniture					1.67	4.44
Togo						
Forestry and logging					1.38	2.53
Solid wood products					2.09	4.98
Pulp and paper products					2.18	5.95
Wood furniture					1.66	4.20
United Republic of Tanzania						
Forestry and logging					1.44	2.47
Solid wood products	2	3	6	11	2.25	4.83

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Pulp and paper products	2	3	8	13	2.36	5.76
Wood furniture	4	3	9	16	1.76	4.08
Uganda						
Forestry and logging	3	1	3	8	1.42	2.42
Solid wood products	8	10	20	37	2.21	4.70
Pulp and paper products					2.31	5.60
Wood furniture					1.73	3.98
Zambia						
Forestry and logging	2	1	3	6	1.42	2.57
Solid wood products	1	2	4	7	2.20	5.08
Pulp and paper products	2	2	7	11	2.31	6.08
Wood furniture	2	1	5	8	1.73	4.29
Zimbabwe						
Forestry and logging					1.41	2.41
Solid wood products					2.17	4.65
Pulp and paper products					2.27	5.54
Wood furniture	1	1	3	5	1.71	3.94
Americas						
Latin America and the Caribbean						
Bahamas						
Forestry and logging					1.29	2.10
Solid wood products					1.84	3.85
Pulp and paper products					1.91	4.54
Wood furniture					1.51	3.29
Barbados						
Forestry and logging					1.26	1.67
Solid wood products					1.75	2.75
Pulp and paper products	1	1	2	4	1.82	3.17
Wood furniture					1.46	2.41
Belize						
Forestry and logging					1.28	1.85
Solid wood products	2	1	2	5	1.79	3.21
Pulp and paper products					1.86	3.75
Wood furniture					1.48	2.78
Bolivia (Plurinational State of)						
Forestry and logging					1.36	2.10
Solid wood products	3	4	6	13	2.02	3.86

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Pulp and paper products	3	3	7	13	2.11	4.55
Wood furniture	1	1	2	3	1.62	3.30
Cuba						
Forestry and logging	14	6	17	38	1.45	2.70
Solid wood products	8	10	23	41	2.28	5.41
Pulp and paper products	3	4	12	18	2.40	6.49
Wood furniture					1.78	4.55
Dominican Republic						
Forestry and logging					1.38	2.19
Solid wood products	2	2	4	7	2.08	4.09
Pulp and paper products	3	4	9	17	2.17	4.84
Wood furniture	6	4	11	21	1.65	3.49
Ecuador						
Forestry and logging	13	5	9	27	1.37	2.03
Solid wood products	4	4	7	15	2.06	3.67
Pulp and paper products	9	11	20	41	2.15	4.32
Wood furniture	5	4	8	17	1.65	3.15
El Salvador						
Forestry and logging	9	3	7	19	1.35	2.12
Solid wood products	6	6	11	23	2.00	3.91
Pulp and paper products	4	5	11	21	2.09	4.62
Wood furniture	2	2	4	8	1.61	3.34
Guatemala						
Forestry and logging	10	4	6	19	1.36	1.94
Solid wood products	1	1	1	2	2.02	3.44
Pulp and paper products	2	2	3	6	2.11	4.03
Wood furniture	48	30	65	143	1.62	2.96
Guyana						
Forestry and logging	4	1	2	7	1.28	1.68
Solid wood products	4	4	4	12	1.79	2.77
Pulp and paper products					1.86	3.20
Wood furniture					1.48	2.42
Haiti						
Forestry and logging					1.33	1.93
Solid wood products					1.94	3.41
Pulp and paper products					2.02	4.00

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Wood furniture					1.57	2.94
Honduras						
Forestry and logging	2	1	2	5	1.34	1.97
Solid wood products	9	9	14	32	1.97	3.53
Pulp and paper products	2	2	3	6	2.05	4.15
Wood furniture	9	5	13	27	1.59	3.03
Jamaica						
Forestry and logging					1.32	1.93
Solid wood products	1	1	1	2	1.92	3.42
Pulp and paper products	1	1	3	6	2.01	4.01
Wood furniture	2	1	2	5	1.56	2.95
Nicaragua						
Forestry and logging	15	5	10	31	1.33	2.00
Solid wood products	15	14	25	55	1.95	3.60
Pulp and paper products	1	1	2	4	2.03	4.23
Wood furniture					1.58	3.09
Panama						
Forestry and logging	2	1	1	4	1.34	2.00
Solid wood products					1.98	3.61
Pulp and paper products	1	1	2	4	2.07	4.24
Wood furniture	1	1	2	5	1.60	3.10
Paraguay						
Forestry and logging	3	1	2	6	1.35	2.02
Solid wood products	6	6	11	24	2.00	3.65
Pulp and paper products	2	2	4	8	2.09	4.30
Wood furniture	13	8	20	41	1.61	3.14
Saint Vincent and the Grenadines						
Forestry and logging					1.27	1.90
Solid wood products					1.76	3.34
Pulp and paper products					1.82	3.91
Wood furniture					1.46	2.88
Suriname						
Forestry and logging	6	2	4	12	1.31	2.04
Solid wood products	7	6	12	25	1.87	3.70
Pulp and paper products					1.95	4.36
Wood furniture					1.53	3.17

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Trinidad and Tobago						
Forestry and logging	1	0	1	2	1.31	1.84
Solid wood products	2	2	2	6	1.87	3.19
Pulp and paper products	2	2	3	6	1.95	3.72
Wood furniture					1.53	2.76
Uruguay						
Forestry and logging	15	6	16	37	1.37	2.43
Solid wood products	3	3	8	14	2.06	4.71
Pulp and paper products	2	3	8	14	2.15	5.61
Wood furniture	1	1	3	6	1.65	3.99
Venezuela (Bolivarian Republic of)						
Forestry and logging	0	0	0	0	1.41	2.26
Solid wood products	25	29	52	106	2.17	4.27
Pulp and paper products	28	36	78	142	2.28	5.07
Wood furniture	12	9	24	45	1.71	3.63
Asia						
Central Asia						
Kyrgyzstan						
Forestry and logging	1	0	0	1	1.16	1.24
Solid wood products					1.45	1.62
Pulp and paper products					1.49	1.77
Wood furniture					1.27	1.50
Tajikistan						
Forestry and logging	2	0	0	2	1.16	1.21
Solid wood products	1	1	0	2	1.44	1.56
Pulp and paper products					1.48	1.69
Wood furniture					1.27	1.45
Turkmenistan						
Forestry and logging	9	2	1	11	1.18	1.27
Solid wood products					1.50	1.70
Pulp and paper products					1.54	1.87
Wood furniture					1.30	1.56
Uzbekistan						
Forestry and logging	2	0	0	3	1.19	1.27
Solid wood products	4	2	1	6	1.54	1.71
Pulp and paper products	7	4	2	13	1.59	1.88
Wood furniture	10	3	2	15	1.33	1.57

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Eastern Asia						
Mongolia						
Forestry and logging					1.37	1.99
Solid wood products	3	3	5	11	2.06	3.58
Pulp and paper products	1	1	2	5	2.15	4.21
Wood furniture					1.64	3.08
South-eastern Asia						
Lao People's Democratic Republic						
Forestry and logging	5	1	2	8	1.31	1.62
Solid wood products	10	8	7	25	1.87	2.61
Pulp and paper products	1	1	1	3	1.95	3.01
Wood furniture	12	6	9	27	1.53	2.30
Myanmar						
Forestry and logging	34	12	11	57	1.34	1.67
Solid wood products	2	2	2	6	1.97	2.74
Pulp and paper products	3	3	3	9	2.06	3.17
Wood furniture					1.59	2.40
Southern Asia						
Afghanistan						
Forestry and logging					1.16	1.21
Solid wood products	1	1	0	2	1.47	1.55
Pulp and paper products					1.51	1.68
Wood furniture	8	2	1	12	1.28	1.44
Bangladesh						
Forestry and logging	1	0	0	1	1.20	1.25
Solid wood products	14	8	1	23	1.56	1.65
Pulp and paper products	26	16	5	48	1.61	1.81
Wood furniture					1.34	1.52
Bhutan						
Forestry and logging	1	0	0	2	1.15	1.25
Solid wood products	1	1	0	2	1.42	1.65
Pulp and paper products	1	1	0	2	1.46	1.81
Wood furniture					1.25	1.52

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Iran (Islamic Republic of)						
Forestry and logging	7	2	1	9	1.22	1.35
Solid wood products	16	10	4	30	1.62	1.90
Pulp and paper products	35	23	15	73	1.68	2.12
Wood furniture	28	11	10	48	1.38	1.72
Nepal						
Forestry and logging	13	2	1	15	1.16	1.20
Solid wood products	17	8	1	26	1.47	1.53
Pulp and paper products	5	2	1	8	1.51	1.66
Wood furniture	37	11	5	53	1.28	1.43
Pakistan						
Forestry and logging	32	6	2	40	1.20	1.26
Solid wood products	4	2	0	7	1.58	1.67
Pulp and paper products	17	11	4	32	1.63	1.84
Wood furniture	11	4	2	16	1.35	1.54
Sri Lanka						
Forestry and logging	15	3	0	18	1.17	1.19
Solid wood products	34	17	0	51	1.49	1.50
Pulp and paper products	6	3	1	10	1.53	1.62
Wood furniture	9	3	1	13	1.30	1.40
Western Asia						
Armenia						
Forestry and logging	3	1	1	5	1.21	1.48
Solid wood products	3	2	2	7	1.59	2.26
Pulp and paper products					1.64	2.56
Wood furniture					1.36	2.01
Azerbaijan						
Forestry and logging	1	0	0	2	1.22	1.43
Solid wood products	2	1	1	3	1.62	2.11
Pulp and paper products	1	1	1	3	1.68	2.38
Wood furniture	4	2	2	8	1.38	1.90
Bahrain						
Forestry and logging					1.21	1.57
Solid wood products	1	1	1	3	1.60	2.49
Pulp and paper products	2	1	2	4	1.65	2.85

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Wood furniture	2	1	2	5	1.36	2.20
Georgia						
Forestry and logging	8	2	2	12	1.21	1.45
Solid wood products	1	1	1	3	1.59	2.17
Pulp and paper products	1	1	1	3	1.64	2.45
Wood furniture	3	1	2	6	1.36	1.94
Iraq						
Forestry and logging					1.25	1.51
Solid wood products					1.70	2.31
Pulp and paper products					1.76	2.63
Wood furniture	13	5	8	26	1.42	2.06
Jordan						
Forestry and logging					1.24	1.65
Solid wood products	3	2	3	8	1.68	2.68
Pulp and paper products	4	3	5	11	1.74	3.09
Wood furniture	10	4	10	25	1.41	2.35
Kuwait						
Forestry and logging					1.22	1.62
Solid wood products	1	1	1	4	1.64	2.60
Pulp and paper products	2	2	3	7	1.69	2.99
Wood furniture	5	2	5	12	1.39	2.29
Lebanon						
Forestry and logging					1.24	1.62
Solid wood products	1	1	1	3	1.67	2.60
Pulp and paper products	4	3	5	12	1.73	2.99
Wood furniture	7	3	6	16	1.41	2.29
Oman						
Forestry and logging					1.22	1.54
Solid wood products	5	3	4	13	1.64	2.41
Pulp and paper products					1.69	2.75
Wood furniture	3	1	2	6	1.39	2.13
Qatar						
Forestry and logging					1.18	1.50
Solid wood products	6	3	5	14	1.53	2.30
Pulp and paper products					1.57	2.62
Wood furniture	4	1	3	9	1.32	2.05

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
United Arab Emirates						
Forestry and logging					1.22	1.49
Solid wood products	28	17	19	64	1.62	2.28
Pulp and paper products	10	7	9	27	1.67	2.60
Wood furniture	36	14	24	74	1.38	2.03
Yemen						
Forestry and logging					1.21	1.35
Solid wood products					1.59	1.91
Pulp and paper products					1.65	2.13
Wood furniture					1.36	1.73
Europe						
Eastern Europe						
Belarus						
Forestry and logging	43	16	18	77	1.36	1.78
Solid wood products	39	40	39	118	2.03	3.03
Pulp and paper products	12	14	17	44	2.12	3.53
Wood furniture	30	19	30	78	1.63	2.64
Republic of Moldova						
Forestry and logging					1.29	1.51
Solid wood products	1	1	1	2	1.83	2.34
Pulp and paper products	1	1	1	3	1.91	2.66
Wood furniture	3	2	2	7	1.51	2.08
Ukraine						
Forestry and logging	65	24	23	113	1.37	1.73
Solid wood products	37	39	30	106	2.06	2.88
Pulp and paper products	28	32	33	93	2.15	3.34
Wood furniture	33	21	29	83	1.64	2.52
Southern Europe						
Albania						
Forestry and logging	2	0	0	2	1.28	1.47
Solid wood products	1	1	0	3	1.79	2.21
Pulp and paper products	3	2	2	6	1.86	2.51
Wood furniture	3	1	1	6	1.48	1.97
Andorra						
Forestry and logging					1.23	1.59
Solid wood products					1.66	2.53

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Pulp and paper products					1.72	2.90
Wood furniture					1.40	2.23
Bosnia and Herzegovina						
Forestry and logging	7	2	1	10	1.28	1.42
Solid wood products	12	9	3	25	1.78	2.08
Pulp and paper products	3	2	1	6	1.85	2.35
Wood furniture	8	4	3	15	1.48	1.87
Montenegro						
Forestry and logging					1.26	1.51
Solid wood products	1	1	1	3	1.75	2.32
Pulp and paper products					1.82	2.64
Wood furniture					**1.46**	**2.06**
North Macedonia						
Forestry and logging					1.27	1.46
Solid wood products	3	2	1	6	1.78	2.20
Pulp and paper products	1	1	1	3	1.85	2.50
Wood furniture	4	2	2	8	1.48	1.97
Serbia						
Forestry and logging	6	2	1	9	1.30	1.46
Solid wood products	14	12	5	30	1.85	2.19
Pulp and paper products	6	5	3	14	1.92	2.48
Wood furniture	15	8	7	29	1.51	1.96
Western Europe						
Liechtenstein						
Forestry and logging					1.11	1.20
Solid wood products					1.33	1.51
Pulp and paper products					1.35	1.63
Wood furniture					1.20	1.41
Oceania						
Melanesia						
Fiji						
Forestry and logging	2	0	0	3	1.16	1.29
Solid wood products	1	1	0	3	1.45	1.75
Pulp and paper products					1.49	1.93
Wood furniture	1	0	0	2	1.28	1.60
Papua New Guinea						
Forestry and logging	7	1	0	8	1.16	1.19

Region and area	Direct effects	Indirect effects	Induced effects	Total effects	Type I multiplier	Type SAM multiplier
	---------- thousand jobs ----------					
Solid wood products	4	2	0	6	1.45	1.49
Pulp and paper products					1.49	1.60
Wood furniture	1	0	0	1	1.27	1.39
Solomon Islands						
Forestry and logging	10	1	1	12	1.14	1.21
Solid wood products					1.39	1.54
Pulp and paper products					1.42	1.67
Wood furniture					1.24	1.43
Vanuatu						
Forestry and logging					1.13	1.21
Solid wood products					1.38	1.55
Pulp and paper products					1.41	1.69
Wood furniture					1.23	1.44

Sources: Author calculations based on UNIDO. 2021. *International Yearbook of Industrial Statistics 2021*. USA: Northampton, MA. Edward Elgar Publishing, Inc.; ILO. 2021. *ILOSTAT: employment by sex and economic activity*. https://ilostat.ilo.org/data/. Cited 10 October 2021; UNSD. 2021. *Employed population by status in employment, industry and sex*. http://data.un.org. Cited 10 October 2021.

Note: Direct effects measure existing activities in the forest subsectors. Total effects = direct effects + indirect effects + induced effects. For each country, Type I multiplier = (direct effects + indirect effects) / direct effects; Type SAM multiplier = total effects / direct effects. Estimates below 1 000 jobs are suppressed.

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